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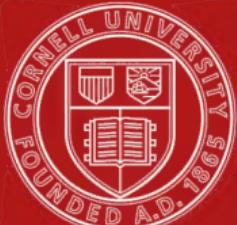
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ACROSS LOTS

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BY

HORACE LUNT



BOSTON
D. LOTHROP COMPANY
FRANKLIN AND HAWLEY STREETS

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TO

Willis Boyd Allen,

WHOSE FRIENDLINESS AND CHAMPIONSHIP GAVE
DIRECTION AND ENCOURAGEMENT,

THIS BOOK IS DEDICATED,

IN GRATEFUL REMEMBRANCE, BY THE AUTHOR.

PREFACE.

THESE papers, describing the common objects of Nature around the "Hub," and originally published, from time to time, in the Popular Science Monthly, Lippincott's Magazine, Cottage Hearth, Outing, American Naturalist, Harper's Young People, and Our Sunday Afternoon, to all of which publications the writer owes grateful acknowledgments, have since been written out at greater length, and now presume again to start together on their journey.

If these gleanings from wood and field may in any direction invite young people to use their eyes and ears in examining and considering the works of Nature, or if "children of larger growth," whose circumstances and vocations do not often permit them to ramble over enchanted grounds, may be interested for an hour in reading the simple sketches, the author will feel that they have not been written in vain.

HORACE LUNT.

Boston, 1888.

CONTENTS.

I	
A MARCH RAMBLE	11
II	
LEAVES FROM AN APRIL JOURNAL	29
III	
THE RETURN OF THE NATIVES	63
IV	
WOOD NOTES AND NEST HUNTING	97
V	
WINGED ROBBERS AND NEST-BUILDERS	141
VI	
WONDERS OF POND LIFE	169
VII	
A BUSY CITY AND THOROUGHFARE	193
VIII	
FIELD NOTES IN SEED TIME	207
IX	
CROSS-CUT VIEWS OF WINTER	227

A MARCH RAMBLE.

ACROSS LOTS

I.

A MARCH RAMBLE.

MARCH, in New England, is the disputable month between the seasons spring and winter; the space, as it were, between the picket lines of both armies, where many battles are fought for the mastery and power of governing the land. Winter commands Boreas to station his wind batteries on the bleak Northern hills to belch forth a storm of snow and hail, and a general frigid icicle charge is ordered along the whole line until not a vestige of spring is seen. Then the frost army, wearied with its fierce onslaught, sleeps, and the vernal force, driven far southward, turns again its face toward the foe, insidiously creeps along the flank, and takes the gray old general in his fancied stronghold by surprise. There is a peculiar quality in the air, which tells you it is the breath of spring. The snow melts on the southern slopes and your eyes

get relief by looking on the tufts of green water-grass along the edges of the stream now set free. Winter wakes again and marshals his strength, but his front is not so vigorous. He sullenly retires before the genial commander of the other side, that moves slowly but steadily forward to victory and the vernal equinox.

How large the catkin buds on the willows have swollen thus early in the season, and how closely they watch the sun in his march northward! Divest this poplar bud of its impervious scales and see with what wonderful tenderness and care the old dame has clothed the rudimentary blossom. A mouse's fur is not finer than this garment that protects the soft, delicate, larva-like catkin from the sudden changes peculiar to this season.

At almost every turn in this ramble through the woods I come upon pictures that the artist might choose for the canvas. Nature appears to make no chromatic errors here. Besides the browns and grays and the different shades of spruces, pines and hemlocks, she exhibits many exquisite touches of coloration. The high blackberry stalks are painted a beautiful purple. The young, lithe shoots of the willow shine like lacquered brass. Here is a rare design for a Christmas card: a green-

brier clambering over an ilex; the green and gray bark and the mingled clusters of blue and bright red drupes gleaming in the sunlight are very effective. The persistent bunches of scarlet berries of the night-shade vine, twining among the bleached, cream-colored leaves that still adhere to the lower-most branches of this water beech, viewed against a background of sky and snow, form one of the most delicate pictures in this gallery.

Now that the leaves have fallen from this tangled mass of green-brier (*smilax rotundifolia*) one can see the ingenious method it has adopted for climbing trees and bushes for its support. On each persistent petiole grows a pair of long tendrils, now withered and almost as tough as manilla hemp. These strings—thousands of fairy fingers—through the past summer were busy winding around every convenient branchlet of the ilex, which seems to be patient under its cumbersome load and resigned to its fate.

The squirrels are out to-day, both the red and gray species; they seem to be actually black in contrast to the immaculate snow along which they skip almost as rapidly as a bird flies. The imprints of their feet show the extraordinary leaps they sometimes make when startled and on the

home stretch. When at full speed their tracks are shown thus: --: - - : - - : and measure five and six feet at every bound. Here and there through the woods they have dug holes in the snow for beech-mast and acorns. Evidently the little rodents knew just where to search for the hidden treasures, for plenty of shells lie scattered around at the top of the shaft. The females are busy in renovating and repairing their old nests in the thick cedars. The old bark that falls away from the trunks of these trees offers them abundant material. It is curious to see them scampering up and down the trunks, with streamers in their mouths, and their quick, smart motions, incorporating the cedar strips within the nest mass. This abode must be made snug and comfortable for the shivering litter that within a fortnight will be wriggling in the softly-upholstered inner room.

In the midst of the spray of a prostrate white birch is quite a large piece of bagging that some cunning mother rodent has appropriated and fashioned into a comfortable home for the prospective family. How nicely it is folded and conformed to the angles of trunk and limbs! The under parts are whole, but the upper portion, where it has been gathered in folds, is raveled out and chewed

up finely into a woolly mass, as if Bunny had been taking lessons in natural philosophy, on the conduction of heat, and had learned that the warmth of her naked litter would not be quickly carried off through this furry heap.

C—— tells me the adventure he had with a mother squirrel which illustrates the ardent maternal devotion of these rodents. Two quarter-grown gray Bunnies had been carried by their mother to a hole in a shell-bark trunk for safe-keeping and tender nursing. C——, who had an eye to the main chance, and knew the market value of this species, had seen the transaction, and, with a ladder, proceeded to lay siege to the retreat. Having climbed to the doorway, he put his hand in to capture his prizes, when it was immediately attacked by the desperate mother, who tried to bite it, then struck it with her paw, at the same time making a noise similar to the spitting of a cat. He at last succeeded in grasping her nape, and dropped her to the ground. She at once returned to her charge, however, and it was not until he had served her three times in this manner, that he was able to seize and make off with his young nut-crackers, followed by the parent, who made several attempts to spring into his face, or traversed the branches

over his head, all the time barking in the most distressed manner.

A small company of goldfinches and red-polls have just flown into a growth of beeches, fluttering among the branchlets and clinging in all kinds of positions on the slender twigs, inspecting the sharp, thorn-like buds and peering into the persistent last year's catkins. They hurry from tree to tree as if they did not expect to find much to eat here, but had dropped down merely to ascertain the prospects while on their way to some evergreen caravansary to obtain shelter for the night. Presently they light on the snow and leisurely go hopping off northwestward, picking up crumbs from the white tablecloth; a scanty meal indeed, it seems, yet how sleek and plump they look in their shining olive-brown overcoats, trimmed with yellow and white. Ah! these finches knew, ages before the botanist, how much nourishment was stored up in the seeds and buds. How silent they are! It is now no time for song and mirth; every moment must be spent in supplying their little furnaces with a sufficient accumulation of heat. Many asters and golden-rod, beech and pine-trees in embryo, burn away in their living ovens to keep the sturdy little creatures alive and warm.

The meat-eaters, too, are out on their entomological tours. How eagerly the titmice and woodpeckers search for the baskets of spiders' eggs, and the fat pupas under the bark; knowing as well where to find them as the most experienced Esquimaux do the seal and walrus. Look at this nut-hatch, with ashen blue back and clear white under parts. It is wonderful how this tree-climber clings to the trunk so easily. It does not seem possible that his claws could take sufficient hold on the bark to sustain him as he lightly hops along the sides. He apparently makes a superficial inspection, and does not remain long on one tree, flying here and there, as if he had considered beforehand what particular ones to visit. As he comes quite near me I observe his short, wide tail which he seems not to use at any time for a support; and, unlike the woodpeckers, he has three toes placed forward, while the hind one is much stouter and longer than the others, and serves as a prop when resting head downward, as is his usual habit.

How can these feathered mites endure the rigors of winter in our Northern woods? Import representatives from the family of wood-warblers, for instance, and let them free, and how quickly they would perish here—a barren waste to them; for

they do not relish seeds ; the insects are not moving in hosts, and their weak, slender bills are not fitted to dig under the bark for dainty morsels.

The sounds heard are of the woods. How sharply the tack, tack, of the wood-chopper's axe comes to your ear, as if conveyed through a tube. Here a white oak tree, recently sawed squarely and smoothly from its stump, gives one a good opportunity to count the annual rings. A diagram of seventy circling years is here plainly drawn on this cross-cut bole, and tells a curious story since it started out from its shell so long ago. The first ten years of its life the sapling was weakly and slim, in consequence of the overshadowing branches of its elderly neighbors ; but after reaching its teens it began to be more thrifty. From the fifteenth to the thirtieth year it grew more rapidly than at any other period of its existence. Outside the thirtieth ring, which was the broadest, they became narrower and more indistinct. The tree had grown faster on the southwestern side, as shown by the curious irregular zones. This evidently was due to the milder winds and the genial influence of the sun's rays, in the spring, on the rich, mucilaginous sap. The ducts in the older layers have become clogged, and seem no longer to

have taken an active part in the circulation; so this is why the heart-wood first dies and begins the process of decay from the center, in such kinds of trees.

The choppers have been cutting and cording with the oak-wood, some sweet-scented black birch sticks. How beautifully polished is the bark of reddish bronze, like cherry-tree bark, and the inner layer of green liber is as sweet and aromatic as a checkerberry lozenge, so different from the disagreeable tannic-acid of the oak.

The voice of the crow yonder is not unpleasing, for it teaches a lesson of hardihood, perseverance and cheerfulness. There is a shade of pathos withal, that appeals to the sympathy. What a season of starvation has been his, and yet amid all his hardships how strongly and hopefully he has “pulled through” the cold winter months. Like his celebrated ancestor “Grip,” in Barnaby Rudge, he possesses the same buoyant spirits. “Never say die” is uttered in tone, if not in word, with as much animation. The love of home is strong within his black breast, and the old pine-tree is the central point from which this couple for years have viewed the world, and where now they come to talk over again the matter of housekeeping.

Over the hemlocks a party of these birds have gone into hysterics at sight of a hawk which sails and circles in the air, without seeming to take any notice of the passionate outbreak, and as if it were intent on measuring, with its feathered calipers, a certain extent of country before nightfall. With a glass can be seen readily its chestnut tail, glistening in the sun, and the silvery gray under parts, marked with interrupted, faint brown bands. So it is the red-tailed hen hawk that has spent his winter in Southern New England, and perhaps has surveyed a degree thus early to-day. In gracefully describing its airy circles, the tips of the motionless wings are bent upward, and at a certain angle of vision the bird is like a huge bracket against the sky.

A chipmunk is taking a constitutional after the long burrowing season. It appears to be thirsty and halts in its scampering over the boulders, where the snow has melted, to drink at the little pools standing in the hollows. How has it managed to wash down the hazel and beech-mast, acorns and buckwheat in winter quarters? Its mode of drinking is like that of cats and the carnivora in general, excepting the tongue is not protruded so far from the mouth. It touches the tip

of its nose to the surface and appears to nibble at the water. How different it is from the common red or gray squirrel. Its tail, the peculiar longitudinal stripes, the motions, the shorter feet, and even the trail it leaves behind it in the snow, tells you that it belongs to another genus in the family of rodents.

It is not a great climber, rarely ascending tall trees; yet it likes fresh food in the early spring, and is out to see how the buds on the red maples are getting on.

The thorn-like buds on the beech saplings are larger and farther advanced than those of the older trees. Is this owing to the impetuous sap of youth? On the terminal bud of a shell-bark hickory I count fourteen wraps before the tender baby leaves are laid bare. What wise provision has been made for these infants, and how admirably adapted to temper the rapid changes of air are these coverings, each one as impervious to the moisture as a rubber blanket, and thickly covered on the outside with the finest silky floss.

When did the blossom buds of the swamp maples expand? They were not noticed five days ago! The large terminal buds of the horse-chestnut, too, are covered with a coat of varnish, as if Nature's

craftsmen, that especially attended to this kind of trees, had suddenly awakened to their duty and besmeared them through the night. What wise designing !

It was but yesterday pedestrians were holding on to their ears, the snow was crisp and the windows frosted, so cold was the wind. But some time in the night the spirit of mildness borne along the air, visited the ornamented panes and wiped off the water-color pictures. How grateful to the senses are these rare day-spring messages ! The breath of air moving from the southern Elysian fields infuses new life and quickens the blood. Did I imagine it, or really did my nostrils catch just a whiff of perfume brought by Southern breezes that had swept over millions of tropical flowers ?

As if I had passed from winter into spring I catch the notes of the yellow-shafted woodpecker. The sun has just thawed him out, and the drops of wet, wet, wet, wet, fall rapidly from his mouth. I hear, too, the voice of a distant relative of the crow ; the blue jay. There is a metallic ring in his larynx that sounds like the far-off blows of a hammer on an anvil ; or, if one stops to analyze it, he discovers withal a mournful intonation, as if he invited everybody within earshot to pity him because he

could not yet find a plentiful supply of eggs and young for his hungry maw.

At noon not a cloud is seen, and the sky is of the deepest blue. Sharply outlined against it, at this point of vision, are the gray branches of the hard-wood trees, marking the dome with all kinds of angles, scrawls, and curves, showing how from the shoots they have struggled in every conceivable direction to get the light.

The southern slope of the hill along which I walk, where the snow is melting fast, and the tiny rills, capillaries in the great water-shed system, trembling and pulsating in the light, is flecked and dappled with white and different shades of brown, and tiny spots of green. The radical leaves of various perennials are here. I am surprised to see quite a number of grasshoppers moving about in almost as lively a manner as in the summer time. These are the pupæ, and not the full-grown insect, for none of them measure more than half an inch in length, and the rudiments of the wings are just appearing from behind the lateral pieces of the dorsal arc. There are two species ; a light-brown and a green kind, belonging to the genus *Tragocephala* (goat-headed), relating probably to the striking resemblance their heads bear to those of goats ;

that is, sloping inward and their horns (*antennæ*) curved backward. It seems singular to me that this kind of insects should appear so early in the season, yet the books say they are often seen in unusually warm days in winter. It is evident that the eggs deposited last autumn could not have hatched in the winter, for the ground is frozen. Probably the larvæ appeared last season, and had undergone several moultings before the severe weather forced them into the torpid state, from which it is clearly seen they are easily awakened.

The first song sparrow alights on an alder twig in the midst of catkin tassels, that give the early singer a very pretty and appropriate setting. While contemplating this scene, a bluebird perches on the telegraph wire, and ripples out a brief sweet spring message to the confined operator in town. It is doubtful if the person at the sounders received it. “*Ce-rue-le-an*,” he sings : “Spring is here ! Do you hear it ? Do you hear it ?” After which he bends his head to the wire, as if hearkening for a response. It is an agreeable sound to your hibernating brain ; a wavy chime as sweet and mellow and refreshing to the ear as a diet of fresh berries, or a mess of pot herbs, from Southern gardens, is to the taste. Now quickly and without the move-

ment of the wings he turns upon this slender lookout, as if operated on by the batteries, and shows his soiled breast. His purling song has brought a female near.

What is the cause of this low, musical, continued noise, not like the distant roar of ocean in the sea shell, but a murmuring in tenor, perpetually sounding in your ears — a phantom sound that suggests the indistinct hum of insects, the chirping of crickets, or the faint peeping of birds or frogs? It is heard everywhere, this ghost din, but it is quickly banished as the ear catches any real voice of Nature, as the brook's music, the cawing of the crows, or even the slightest stir of the air. Is not this what Thoreau means when he speaks of the "day song"? Occasionally an imaginary cricket's chirp, or a bird's brief warble seems more pronounced, and causes one to turn his head to see the wing that produced it, but it is a vain search, and leads you on like will-o'-the-wisp, with the same sound wherever you may go —

"A stillness, fresh and audible,
As if the hand of music through
The sombre robes of silence drew
A thread of golden gossamer."

If it is the “ringing in the ear,” I love to fancy its whisperings and promises of spring; the aërial particles here thrown into vibrations by the distant voices southward, which the advancing sun is wakening into tune.

LEAVES FROM AN APRIL JOURNAL.

II.

LEAVES FROM AN APRIL JOURNAL.

IT is now, in the first April days, and indeed all through the month, curious and interesting to note the gradual, almost insensible onward movement and unfolding of the season. The green grass is creeping everywhere ; first, along the streams and lowlands, then sprinkling the russet hillsides and uplands with living verdure. The buds swell as the hour-hand moves, and the birds unerringly govern their journey with the earth's revolution, and fly up the curvature, keeping a certain distance from the retreating snow line, till they shall see it enter its frigid fastness behind the Arctic Circle. The red maples and elms are darker against the sky, and the catkins of the willows and alders and birches, in sunny places, are nearly ready to give to the wind their fertilizing dust, so constant are they and so eager to be on time, before the leaves come to interpose, and the strong spring breezes subside.

The harmony of this arrangement of the blossom coming before the leaf is very interesting to contemplate. In many of our large trees and shrubs this is the case. The alder, willow, walnut, oak, beech, etc., are catkin-bearing trees. They have two kinds of flowers, staminate and pistillate, which are situated either on the same stem or on different individual plants. Now, if the leaves came first, they would interfere and to a great extent prevent the wind from scattering the pollen of the catkins, which fertilizes the pistillate blossom. Nature has said to the leaves, "Wait! do not come yet: the boughs must be naked, that the wind may have a free chance to strew the propagating dust on every fertile flower."

How carefully Nature has looked after and kept green the radical leaves of the perennial herbs! Here is the five-finger, the swamp blackberry-vine, and some of the composites, as freshly supplied with chlorophyl as any of the after-leaves will be a month from this date. The frost, strange as it may appear, has not affected them: their roots, stored with starch, keep them ever fresh and ready with their gainful handicap to begin their race with the annuals. The thick descending root-stocks of the skunk cabbage are sending up everywhere in the

bogs the pink-hooded spathes which sheltered the round-head clusters of flowers. The bunches of young violet leaves beside them are doing their work differently: the blossoms come after the leaf, and are strangely unlike their neighbors to the nostrils of humanity; yet in the great economy of Nature "she knows only vegetable life existing to a universal and not to a particular end." The offensive *fætidus* is as good in her eyes as the sweet-scented *cucullata*, and, like the tender mother she is, she nourishes each, and knows not the difference between the repulsive child and the lovely blue-eyed flower. The first leaves of the *Cardamine* (Spring Cress), another inhabitant of the bog, have grown two or three inches already. I pull up a cluster of these leaves and learn the secret of its confidence and smartness. "Stems upright from a tuberiferous base," says Grey; and this peculiarity distinguishes it from all other species in the genus. These small potato-shaped tubers at the end of the stem laid by so much starch and plant food the previous year that it has now a great advantage over the annuals and laggard perennials that slowly germinate from fibrous roots or seeds.

On the dry banks and knolls a few of the earliest perennials, however, have been willing to show their

blossoms. I am almost surprised to find the delicate, blue-eyed Hepatica peeping out from the dead mass of fallen leaves; the slender scape and the fresh new leaves now unfolding are warmly clothed with soft wool-like hairs, as if Nature feared to send them forth these uncertain days without their over-coats. Here, too, are the earliest of the composites; plantain, everlastings with their woolly leaves and inconspicuous flowers, curling out of the brown. This low cudweed has two kinds of flowers on different individual stems; on one head I find a collection of slender tubular flowers in which the pistils and ovaries are seen, while others bear nothing but stamens. Food for the smaller honey-gatherers is scarce, and so this lowly plant has blossomed early before the gaudy ones have appeared, to attract them to its cups, and thus carry the pollen from one kind to the other.

It is remarkable to what a degree the pond in Spenser's Meadow swarms with different living creatures! The warm rays of the sun have brought into being, as if by magic, myriads of gnats that fringe the shore. One can watch through a glass with deep interest the process of shuffling off their mortal coils and taking wings to sport above the water. Here among the species of green confer-

void algæ the water-boatman rows or turns its pearl wing-covers to view and makes attempts at flight. The large lavender-tinted cyclops, with egg-panniers attached, are seen, while the bivalved cypris toils along in its shell like a miniature argonaut. I find here a species of aquatic coleoptera, a little ovate beetle, entirely a stranger to me, which I have nowhere seen described in the books. Unlike any of the other beetles noticed, the thorax seems to project over the abdomen, leaving a space or groove between this appendage and the beautifully-marked bronzed-and-black wing-covers. In this channel, where it carries its bubble very conveniently, play the long, slender posterior legs so active in propelling the creature through the water. These beetles are able to remain a long time beneath the surface, and, unlike those of the genus *Dysticus*, do not swim up and then turn round to obtain their supply of air, but simply let go the objects to which they cling, and, without using their paddles, rise, tail first, remaining an instant only to perform that wonderful operation, and then scamper down again to feed on the decaying matter at the bottom of the pond.

The toads have rolled themselves out of their mud blankets, and begun their Easter festival and

song, and the bull frogs are chuckling for the first time, as though they were congratulating each other, in true batrachian language, on their fine condition after the long winter's imprisonment in mud; or had found a prize in the water. Some of the huge fellows have actually hopped on the banks to sun themselves and tempt the epicures; and as I come upon them suddenly they express their alarm by uttering sharply a short squeak or yip, followed instantly by a heavy plunge into the water. They are more strictly aquatic than the other species, never appearing at a great distance from their native pond or stream. Three weeks from now these waters will be full of corpulent, squirming tadpoles, hiding themselves in the mud, where daily miracles will be performed; the changing of the gill-breathing fish into the highest form of air-breathing amphibians. In the evening's stillness is heard the musical cheap, cheap, of the pickerel frogs the most pleasing note of batrachian musicians. The water chimes and tinkles with their chanting, as if hundreds of tiny silver bells were ringing here and there over its surface. The power in the toads and frogs to produce such sounds is extraordinary, for, unlike many of the vertebrates, the larynx is in a rudimentary state. The males

only are the minstrels, and, with their capacious air sacks and wide mouths, may be called the cornet and trombone players.

The pond has given up its turtles, that at a distance appear like black dabs of mud scattered along the grassy, sunny banks. They are of the painted or swamp species (*chrysemys picta*), and the earliest to respond to the sun's warmth, in which they will lie for hours to bask. They are watchful and alert, keeping their necks stretched out and their heads continually uplifted to catch the sight or sound of suspicious objects. In one place where the bank slopes conveniently, nine of them have huddled together, and it is curious to see them turn their golden-spotted heads simultaneously like a squad of well-drilled soldiers, at the command of right or left dress, on hearing an unusual noise. As I rise from my hiding-place they all rush pell-mell down the bank, their shells rattling as they tumble over each other in their frantic haste to escape. A moment after the water is studded with heads, and as they see nothing to alarm them, they almost immediately crawl up and crowd themselves on to the same spot as before, their backs now varnished with wet, that brings out more clearly the yellow borders of the dorsal plates, and the blood-red and black blotches

and marks on the sides, looking like Chinese characters. I count thirty-eight pieces on the carapace, twenty-five of which are in smaller squares, nicely jointed and forming the margin.

Now comes a day when the head of the weather-vane points northward, and, although the sun shines, the wind, blowing from off the northern snows, shuts off the heat, and the numberless pulleys in Nature's shops seem nearly motionless. How suddenly the serenaders in the swamps put away their trumpets, and went to sleep under their mud blankets again! The strong wind roars through the branches of the hard-wood trees, and sighs in the pines and hemlocks. The dead, dry leaves underfoot are playing all sorts of antics. Here comes a host of them up the wood-road, racing with each other, in various methods of locomotion, sliding along on their surfaces, rolling on their edges, tumbling, stems over tips and tips over stems, as if they were eager to reach a certain goal at a given time. Some are as erratic in their scampering as the red squirrels, and in particular places flocks of them suddenly rise up and fly away on the wind's wings, like so many startled birds. In the lee of a pile of odorous pine, I find for a while an excellent shelter, and inhale the fragrance of the resinous blood that oozes from

the squarely cut sticks, and shines like glass and amber beads. Under a stone roof I disturb a pair of beetles that are like bits of shining metal suddenly come to life, and scamper off in opposite directions. Over head a pair of tiny kinglets move about on the high limbs, like huge flies. Had these little travelers, too, been duped by the delusive April-fool weather, and begun their journey northward too early? As they fluttered among the twigs it seemed they searched in vain for insects, and were getting back to milder air again.

A typical April soon follows, with alternating sunshine and gentle showers; the kind of weather to make May-flowers and violets. From a sheltering hemlock I see the soft rain fall straight down on a patch of birch saplings, washing the young bark, and stringing the twigs with diamond drops of the first water. Anon the sun looks out from the parted cloud curtains, and lights up these globules with blue, green and gold, and sparkling white. A column of wild geese are flying a half-mile overhead. Their "honking," from this distance, sounds as if they were laughing and joking with their file-leader, like a battalion of cavalry-men. Through the glass I can see their commander now and then slightly turn his head from

side to side, as if he were keeping a sharp lookout for the welfare of his troops, and had a world of trouble on his mind. How perfectly is the alignment of that arrow-head maintained, each individual in the flight preserving the "regulation" distance, as a company of well-drilled soldiers. Why do they fly in two lines, approximating to a point, if not for the purpose of rendering their progress easier, by cleaving the air as the prow of a ship cuts the waters of the ocean? Looking at the strong, steady flight of these navigators with their compasses in their heads, and studying the chart below them, as they sail along, one is inclined to believe that the goose should not be the synonym of stupidity and dullness. It would be curious to know toward what peculiar northern lake or river they are heading, or have in their minds. Is it Memphremagog or St. Lawrence, or is it some river farther northward along the Labrador coast?

A few sullen days are interspersed when the hands on the dial of the month are moved backward and seem to frighten the young spring away. The wind, blowing from the icebergs of the high northern seas, brings in its breath and scatters in its track, rheumatism and other diseases that the New Englander is heir to. Even the jays and

woodpeckers are silent, and the red-wings in the swamps have ceased their mellifluous sug-
le-e-e, for awhile. Sometimes an entire week of cold ends suddenly in a furious, blinding snow storm, that hurls the little icy needles and pellets on the traveler, and as night shuts down he finds himself floundering along "in the depths of spring."

One views the landscape, the next bright morning, as a battle-field whereon the winter fought. A general survey, indeed, gives it a desolate aspect. The springing grasses appear winter-killed and wrapped in winding-sheets. But if the scene is studied in detail, one soon discovers that the vernal army has conquered, or is pressing forward in a noiseless but irresistible counter-charge. The blackbird has already sounded his bugle for the advance, the snow slinks away and flows off in rills and streams of cold, colorless blood. Patches of emerald, banners of the spring's forces, are first seen in the swamps, so bright and vivid, in contrast to the surrounding whiteness. At high noon the ensign of winter is rent in many places and lies in shreds, like strips of white cloth, along the shady sides of walls and thickets, and flocks of those little camp-followers, the fox-sparrows, are scratching lustily, half in the snow and half on the bare

ground, as if they found something especially relishing in such places.

The strength shown in those wire-like legs is truly marvelous. The method of scratching seems not to be like that of the hen. He brings both of his feet forward at the same time, then as quickly as if worked by springs, and in a way only known to him, both claws are suddenly jerked backward, making the leaves fly off far behind.

There is one having a real feast down amongst the water-soaked leaves, but he works so hard with his little legs that he is panting. He has the sensible habit of taking long resting spells, when he seems to listen to some far-off sound, or perchance is musing on the journey he perforce must take, in a few days, to the higher latitudes. A finch of marked characteristics is he. When engaged in searching for food, he gives his whole attention and strength to the work. He is done up in bright colors for a sparrow; the clear white and reddish-brown blotches on the breast and flanks, with the cinnamon on the back, remind one of the best-dressed species of the Thrush family; indeed, Swainson must have been struck with the resemblance to them, for he has given the same specific name that Linnæus has given to the red

wing thrush (*iliaca*), referring probably to the conspicuous markings on the sides and hinder parts of these birds.

The sun, the great time measure, each day gains in power and brings on a fuller tide of life, that rushes up through countless veins of tree trunks, and tender blades and stems. "I am the resurrection and the life!" it potently whispers to seed and rootlet, to egg and pupa; and to the hibernators everywhere, "Awake, come forth!"

April has again leaped into May. All day long the southern breeze seems to have come from the heated equator, passing through different strata of coolness till it reached us rightly tempered to ethereal mildness. There is a hazy, "dreamy, magical light" pervading the atmosphere that corresponds to our pleasant October days, but with the peculiar spring odors,—the earthy scents furnished by the disturbing ploughshares and the aromatic smoke of burning apple-wood, raspberry and blackberry-bushes.

The quick, vibratory motion of the heated air, rising from certain spots in the fields, especially of the hill-tops, can readily be seen with the glass. When viewed against a background of shrubbery of tree-trunks, these quivering atoms are seen

plainer, and resemble the trembling shadows of wavelets and water ripples under bridges and around docks. At times, the puffs of wind blow the dancing atoms away, as it would a swarm of gnats, that again appear when the wind subsides.

The apple-orchards are trimmed, the first spring's work on the farm. How bright and fresh the chips and squarely-cut ends of the twigs appear, in contrast to the dark bark, and how rich the perfume of the oil of *pyrus*! It is the fragrance peculiar to certain cottage hearths. A chimney on R——'s hill in winter and spring always emits an incense of burning apple-tree wood. The air is spiced with it, and retains the scent as the perfume of cologne is retained in a kerchief. The full, rich, mellow alto of the red-wing, like the first liquid note of the bobolink, is suited to the day. Even that crow's note yonder, corresponds with the pleasant spring sunshine. There is not a hint of his usually harsh voice in it, but a contented, satisfied ca-ca-ca-ca, repeated at regular intervals and quite rapidly, as if the bird, for once, had his crop full, and was at peace with all the world. This cannot be his love-note, for it is heard occasionally throughout the open season.

The day is so warm that the robin, whose voice

for a week has been a half-regretful chirp, mounts a high branch, after a bountiful repast from the spongy meadows, and, with a crop full of wriggling worms, gives his love song — the champion robin singer! His tone and articulation was different from others noticed. He seemed to sing in his best voice, sphere-sphere, then chewy chewy. It was a clear case of showing off his talent to his lady love. Both had left the common occupation of the meadows and ascended the holly of holies. Their Pecksniffian character had been entirely cast aside and they had assumed more of the nature and quality of their relatives the thrushes. Later I heard their soft murmurings or bird whisperings in another tree, where I concluded the maiden had said Yes. Amongst a thick growth of young beeches by the stream, a small brown bird is flitting about on the ground and creeping among the dry leaves in such an uncommon, whimsical, mouse-like way, that my inquisitiveness is at once aroused. Moving nearer to obtain a better view it suddenly skulks into a bunch of pine brush towards which I cautiously approach. Soon the little oddity emerges from its retreat, but finding me so near it becomes confused and flies so low, rapidly and irregularly over the brush heap, as to appear for

an instant not like a bird but an indistinct zigzag streak, and vanishes again in the mass of dry pine leaves, where it remains long enough to compose itself and then flies off to another covert, which is sufficiently open for me to secure a rear view of a globular bunch of feathers, a little dark, pot-shaped bird, with two slender wires for the legs, and a short, narrow, turned-up tail for the handle. This I am quite sure is the winter wren (*Troglodytes hiemalis*), and is a stranger in these parts excepting in the spring and fall migrations. As it turns its head in watchful attitude, I observe a rather long, tapering bill, and a streak of light brown over the eye.

As I walk along the fields I scare up troops of birds, most of them sparrows, or finches that probably arrived on the owl train last night. These sparrows are interesting if one possesses the naturalist's curious eyes to note their manifold habits and markings. They are among the hardest winners in the bird's life-race, all retaining that peculiar sparrow quality which must have, in some remote period, prevailed in a strong ancestral type, now, through the law of variation, changed into many genera and species.

Probably these same birds, not two weeks ago,

were foraging by the streams that feed the Santee and Roanoke Rivers. To the casual observer these emigrants now seen appear to be of the same species; yet if he notes closely through the glass their marking, and watches carefully the difference in the manner of feeding, he will be interested in knowing that there are two kinds; the swamp-sparrow (*Melospiza palustris*), and the song-sparrow (*Melospiza melodia*). The crown of the swamp-sparrow is chestnut, while that of the song-sparrow is brownish-red, with a medial stripe of dull gray. The former has a jet-black forehead, which is lacking in the latter. The breast of the song-sparrow is whitish, with clearly-defined dark-brown streaks, and a spot nearly in the centre. This ornament his first cousin does not have, but a plain ashy front, with only a few dull streaks near the wings, and just a hint of yellow on the sides. For a month after their arrival here, before the seeds have well grown, both species love to forage by this stream, as they are doing to-day. The song-sparrow hops along the shore, looking into all the hollows and openings in the banks, which he has inspected a hundred times before, but where each time he finds an overlooked seed or grub. While engaged in his meals, he does not

care to wet his stockings. His relative, however, is half-aquatic in his habits, apparently caring no more for the water than the real long-legged waders. Here is one at this moment standing almost up to his feathers on a submerged rock, flirting over the soaked dead leaves which have been caught by a small snag, and ludicrously scanning their surfaces for bits of mollusks and water-beetles. It is peculiar that these birds of the same genus should entertain such distinct views of the world and mankind. Later in the season the swamp-sparrow hastens to the low ground, where he is suspicious and distrustful, seldom showing himself excepting in times of anxiety, but skulking here and there among the rank weeds and sedges, occasionally uttering his cheap-cheap, as though he were treating you with sneers. The other bird is as open and free from reserve and cheerful as the sunshine, occupying every rock and bush and fence, on which the persistent little songster, from early spring to late fall, pours from his inexhaustible throat the softest, sweetest melodies.

The yellow-hammers are playing in many keys on their xylophones, for the entertainment of their lady-loves. How they make the woods echo ! When one drums on some dead resonant limb, his

head moves so quickly up and down, that it is only at the beginning and the ending of the performance that any motion is perceived, although the ear readily catches each rapidly repeated tap. By this drumming he appears to reach the climax of passionate excitement and fine frenzy. Then he rests awhile as if the operation was painful and he feared a concussion of the brain. The battles of rival males, considering how well armed they are, appear to be the most insipid affairs. Their actions are exceedingly whimsical and fantastic, as if they had tapped, and tarried too long at a wine cask. Here two tipsy fellows have been clinging to an oak trunk for five minutes or more, uttering subdued "peops," and keeping the trunk between them as if one was afraid and the other dared not engage in combat. Doubtless the female from some tree has witnessed this odd proceeding, for one lopes through the branches, to an elm in the field, and is immediately followed by these sham duelists, that are now more animated in their manifestations. They droop their wings and spread their pointed tail-feathers like fans; they alight on the ground and confront each other, holding up their sharp bills, as fencers would their rapiers before they begin to thrust and parry;

then they play up and down in the air like two monstrous ephemerids. All these antics are performed for the entertainment of Mademoiselle Flicker, who with her nice discrimination, and in her own sweet good time will choose the cleverest of these crazed acrobats for her husband. How clean and fresh their plumage looks! Presently one flies off in the meadow and probes for worms. He gives several quick stabs with his sharp bill into the soft earth as though it was a tree trunk, and then remains motionless for some time, with head down, evidently to impale the morsel with his barbed tongue. He hops along slowly and awkwardly, as if he had not yet learned perfectly the trade of the robins, that now lift their heads proudly and stare at him, as if to say, "Why are you trespassing on our domains?" Is it not curious that a bird whose feet are adapted for climbing trees, and clinging to the trunks with rigid tail-feathers, to help support its body, and a beak especially formed to obtain its grub from under the bark, should have thus far changed its habits, and be found hopping about on the grass lands like the thrushes? Perhaps this high hole is in a transitional state, and is, at each succeeding generation, deviating from the true woodpecker

type into some other form, which it is gradually finding out is best suited to sustain it in the great struggle for existence.

Another harbinger of the warm days, which I see the sun has limbered and set in motion, is that pretty butterfly (*Vanessa antiopa*) with purple wings so beautifully marked with yellow borders and blue spots. It is the first butterfly of the season. While most of the species hibernate in the pupal state, and take to themselves wings later in the year, this particular kind crawls, as a perfect insect, into some shelter during the coldest weather, and remains torpid until such days as this bring it back to cheerful life once more. Although the table of sweets has not yet been spread, I doubt not that its long tongue will find something tasteful among the birches toward which it is winging its bird-like way.

Besides the *Vanessa*, two other butterflies have appeared: the common brimstone, wabbling over the meadows, and another with rusty wings, moving with a quick, jerky flight, now among the low shrubs, and then rapidly ascending like a dead leaf, blown by a whirlwind high among the beech branches where the nymph becomes suddenly invisible.

From the cracked bark high up on these birches oozes the exuberant sap that drops on the dead leaves beneath like the drippings of rain after a shower.

What is this mysterious power that sends the juices rushing up through countless tubes into every extremity of these living creatures? We listen in vain for the heart-throb within their wooden breasts, yet life blood flows silently through the arteries and veins, making new wood and liber. The heart indeed is inactive, but if our ears were sufficiently acute, we could catch the sounds of the working of many machines under ground supplying the porous roots with water, acids and earthy salts, which being properly mixed with sugar, mucilage, and protoplasm contained in the root, forms the true sap. This engine is called endosmose. But the force which causes the circulation in every branch and twig, is not a pushing one from below, but a lifting one, many millions of miles above us, indeed, the great source of light and life, the sun. Even from the tips of those buds the moisture in invisible streams, drawn upward into the air, leaving behind certain organic matter in the leaves, and the sap in them being denser, soaks up the thinner fluid in the cells

below; these, in turn, drawing from still lower cells, and so on, thus effecting a steady flow upward, from the little fibers underground, to the smallest tooth-point of the leaf above. Veritable fountains are these trees, which are now beginning to throw up green spray and clouds of blossom.

Those sessile clusters of bright yellow flowers on the spice bush (*Lindera Benzoin*) are very pretty and conspicuous against the almost black bark of that shrub. It is the earliest non-catkin-bearing shrub of this woodland. The aromatic blossoms have the odor of an apothecary shop, and appear several weeks before the leaves. A simple magnifier discloses the curious arrangement of the flower which has really no corolla, it being the six parted calyx which is so brightly yellow, and which answers the purpose of attracting the honey and pollen gatherers. The flowers are not all perfect on each individual plant. On some there is a majority of pistillate blossoms with a great many abortive stamens crowded around the well-developed ovary and stigma; while on other branches there is a larger number of flowers having nine complete stamens, but no pistil. The anthers have two cells, the doors of which are already opened and turned over the apex of the anther, with the pollen grains

adhering to the surface, thus spreading out to the bees tables heaped up with breadstuffs; food indispensable, for the nourishment of the helpless larva at home. How have these insects found their way to this bread mart, which is perhaps a mile away from their hives? What special intelligence told them that on this particular morning the few flowers of this allspice were ready for harvesting? Do they not search for their food, as persons for maple sap; guided by their many powerful eye-lenses, and aided by nice auditory organs and keen scent?

I see their legs sag by means of the burdensome weight, as they fly before a cluster or fascicle, to inspect each little flower. If one does not suit them, they suddenly drop or move sideways to another, as if struck by some invisible force. How wide awake they are on this sunny day! Their many faceted eyes have perhaps multiplied me into a crowd. If I approach them too closely they change their places in a good-natured sort of a way, as if they did not have the power to send me off in disgraceful retreat. There is a character displayed in their manner of flying that denotes an intelligence beyond that of the clumsy blue-bottle or the aimless butterflies.

Insects are now more plentiful, and venture on longer flights. Moths are sensitive to the cool air, but many are coming out of their crevice homes only to be entrapped by the marauding spiders, that have already swung from shrub to shrub their suspension bridges, the ropes of which, as you stand in a favorable light, shine with all the colors of the rainbow. Blue-bottles and other species of flies that have curious life histories, are buzzing around on this sunny slope, and lapping up the sap that oozes from the bruised beech trunks and newly cut maple stumps. Here is one that has invited inspection by alighting on my sleeve; a large plump fellow that has shown himself so soon after the frosts. He is of the woods and fields, and has a wilder appearance than the common house-fly. His legs and body are quite thickly beset with stout black bristles, the upper parts of thorax and abdomen are delicately checkered with gray and black, while the segments below are of dull greenish yellow. This species is in the genus *Tachina*; many of them lay their eggs on beetles and caterpillars, gluing them to the bodies of their victims with an adhesive substance that is proof against moisture or friction.

Notice a colony of sand bees flying low over the

sandy railroad bed. Here is a busybody that has just begun to sink its shaft almost perpendicularly close to the iron track. With what earnestness it sets to work with mandible and tarsi, as though it had determined to take a short cut to peep at some entomological antipodean. In a minute or two it has buried itself, and I can just see the tip of its abdomen, when suddenly it backs out, bringing with its feet the loosened grains of sand and flinging them well out from the hole. In this way it continues to work, remaining longer and longer each time it enters the shaft, the task becoming more difficult as it bores with "tooth and nail" deeper into the earth. One of these passages has been sunk to the depth of fifteen inches, slightly inclined from the perpendicular, and as round as if it had been bored with a gimlet. Following this, I unearthed a female that appeared confused, as she dropped from her burrow, where probably she had just begun glazing and fitting up her first cell for the egg.

The queen humble-bee, dressed in her best yellow satin gown, has ventured out for the first time, and immediately sets to work to find a suitable location for her home. Probably every member of the household except her royal self perished as the

cold weather of last autumn came on. How busily she hums as she flies low over the ground, describing all sorts of lines and curves and angles; now dropping into a dry tussock of grass, now hovering for an instant over a bunch of dead leaves by a stump, and looking with all the many thousand eyes in her precious head for a deserted mouse nest, or a cavity among the surface roots, or a favorable spot where she may dig a cave in which to lay her eggs, that the royal lineage may be preserved! She appears to be a very careful and particular queen. Can it be that she is embarrassed and impatient under my watching, pretending to be busy and thus trying to lead me astray? Probably this is the fact, for after observing her closely a long time, she finally becomes discouraged, gives an angry voice to her wings as she circles near, then suddenly darts away, a moving speck through the trees, and is instantly lost to sight.

In this swamp, overgrown with alders, festooned with drooping catkins and spice bushes, tipped with golden buds, I am suddenly halted by the flight of a hermit thrush that had been feeding within ten feet of my path. With the exception of the robins he is the earliest of the thrushes. He is only seen in the vicinity of the Capitol

of Massachusetts during his migration North and eastward.

Now that he is passing through, it is time to observe him. The name of swamp robin, which is sometimes given him, is an appropriate one, for in his ramblings among the hummocks and soddened leaves in search of food, he bears a strong resemblance to our common red-breast. When he essays long distances, he glides over the ground, then halting suddenly, lifts his body almost in an upright position. How alert he appears, standing with drooped wings and eye dilated with curiosity! Like the robin, he has a way of turning back frequently in his path, or of hopping off abruptly at oblique or right angles to capture some dainty morsel. I note the dusky olive coat, with just a shade of green woven in the fabric, and some rust on the tail, rump, and edges of the wings, as if the garment had begun to fade. His white breast is dashed with dark-brown spots, as if he had bespattered it with mud. Now a whim seizes him, and he runs like a mad bird up on the higher lands, under the trees and round the ledges. In such localities I suspect he often departs from the robin method of foraging, and scratches, sometimes, as the wood thrushes do. Although I did not catch

him in the act, the leaves have been disturbed on the sunny side of a large rock, where, for a while, he has been hiding. In his wanderings he is as dumb as a stuffed specimen, not even a chuck escapes him. His flute notes, like those of the signal horn of Munchausen's postilion, are yet frozen in his throat, and it needs the summer's heat, his native forests, and the inspiration of the tender passion, to melt them into the flowing, liquid melody of song.

Zoölogists say that the birds have many characteristics of the reptiles, indicating their close relationship. To the superficial observer it would seem almost absurd to place this pretty thrush so near a brood of half-grown striped snakes (*Eutænia sirtalis*) that have been drawn up from their cold, damp hibernacle by the warm rays of the sun. How easily and noiselessly these reptilian rills glide along, bending their flexible bodies conveniently to every inequality in their path ; the color of their skins so nicely harmonizing with surrounding objects that it is difficult to follow them with your eyes. One, as I followed it, soon became fatigued, and refused to crawl any farther, but immediately put itself in a defensive attitude by resting on several of its coils, and raising its head as if to

strike; so closely does this harmless species imitate the venomous kind. How accurately the broad scales on the under parts overlap each other, like those of a fish; and in lack of fin, wing or limb, how ingeniously Nature has turned them to account as a means of locomotion! These creatures no doubt are preying on the frogs and mice which are, also, out to get a sun-bath. Here one little rodent runs nervously back and forth across the shallow pools. It has so many enemies, above, below, and on all sides, that it appears confused and puzzled how to take care of its precious little body.

How different are these rodents from the red and gray squirrels that are out in goodly numbers feeding on the elm blossoms!

They all appear to have been well-kept through the winter. Here comes a sleek fellow down this trunk; he stops in his descent to eye me, and remains as motionless as a stuffed specimen fixed to the bark, clinging to it with his hind feet, which are turned completely round, as if his joints were worked like swivels. Now he starts, as if the motionless model had been acted upon by some electrical machine; tilts his tail, and scampers over the mosses and dead leaves; gives short sniffs at

empty acorn-shells, and hurries on confusedly from one object to another, every movement expressing his sense of insecurity while on the ground, finally arrives at the foot of another elm, and, after looking up, apparently to ascertain the kind of tree it is, runs up the trunk so quickly as to appear like a moving streak of bark, and settles down on the opposite side of a topmost branch nibbling a tender bud.

They are great gymnasts, and, when startled, make valiant leaps. It seems hardly possible that muscles and sinews could send them from spray to spray so far apart, and that this should be accomplished by the mere force of the will. Ah! but sometimes they fail. I have seen one miss his foothold and fall forty feet, striking the ground with a heavy blow, where he lay for an instant like a clod. I can hardly think that such adventures can be natural; yet this fellow obviously had the physical ability to endure just such "short stops" as this, for he afterward glided along the ground as though nothing ailed him, and was soon up another tree.

April 30: The rain of yesterday, and the warm sun to-day beating down on the pines and hemlocks, has made a rich, sweet odor, inhaled in

Nature's temples. A steeping process is now going on, and the balsam-laden vapors seem healthful to breathe. As I walk among the trees I catch for the first time the shrill, small, tin-whistle voice of the black-throated green warbler, saying "Few-few, few-day-few." He seems to make it an especial duty, a business which engages his whole care and attention, to visit every tree and branch, and by the brief ceremony of head-lifting and religious chant, to dedicate each anew to the sacred use of song. The melody has a peculiar fitness and quality to these evergreens and seems to regulate and put them in good order once more, after being for so long a time void of cheerfulness.

How elegant he appears in the midst of these common seed-eaters! his voice has the true sylvan quality, and his delicate feet never touch the vulgar earth. He is a bird of the boughs and spray; a Laureate singer that has appeared, as if by accident, in the society of these mobbish groundlings.

THE RETURN OF THE NATIVES.

III.

THE RETURN OF THE NATIVES.

THE sun, more than a month past the vernal equinox, has with his skillful rays well advanced the work of lifting up the blades and unfolding the compact packages of leaves. What a spell is being wrought by the great magician on the tender foliage of yonder growths of oaks and maples, presenting, before the full share of chlorophyl is gained, a beautiful array of colors, which only the autumn's work surpasses !

Young leaves of delicate pink, maroon, honey-yellow, and the various shades of green, appear in the distance like a mist of many hues settled on a spray.

On the southern side of this shelving ledge, wherever a crevice holds a pinch of earth, some kind of plant, that has a liking for such localities, has appropriated it and sprung up like magic. When did these columbines blossom? How art-

fully the crow-foots and smaller Solomon's-seal have managed to force themselves upon your notice until to-day, when the warm sun has commanded them to rise up and flaunt their red and green banners above the walls and ramparts of their fortress !

It is a time, too, for the singing of birds ; each day brings some new arrival ; the hardy finches long since appeared, but the interesting families of wood-warblers must needs wait until now, when crawling and flying insects abound to furnish them with proper food.

Walking by some willows that fringe a stream, I come upon a flock of well-dressed strangers,—some golden-rumped warblers that are flitting restlessly here and there among the branches ; their coats are bluish-gray, streaked with black, each having a single yellow button behind, and sleeves trimmed with yellow lace ; a crown of gold adorns their heads ; their vests are black, in striking contrast to the immaculate bosoms. After a fortnight's sojourn here, they will pass northward to the Canadas, where they will spend the summer season. Their manner of catching insects is similar to the tyrants', but the flight is not so prolonged, nor do they return to the same post of

observation as is the habit of those birds. They cling to the twigs and peer into the bursting buds, not unlike the titmice, or fly down in the meadow and go hopping along through the grass after the manner of the sparrows. I know of no other bird whose habits are so varied. When they attempt longer flights, the course is zigzag, acting as if confused, or like the erratic movements of a kite, when falling to the ground. Oftentimes they turn back again to the tree from which they started, as though they had forgotten to inspect a certain branch just then seen. This warbler is not at all cautious or suspicious. A lack of shyness is noticeable among birds that pass northward to breed. This is the case with the white-throated sparrows, which have lately arrived and are feeding along the hillsides under the beeches and white oaks. As you approach them, they merely perch on the lower limbs, waiting patiently for you to go on. Is this tameness due to the fact that people in the countries, both North and South, where these birds visit, do not molest them as does the inquiring Yankee? And are they slow to learn by experience that man is a more dangerous animal than the cows or sheep among which they evidently feel secure?

This is the first day of the “chippy” on these grounds, although the books say he should have been here three weeks ago. Perhaps these few individuals are tardy from lingering too long around more southern doorsteps and locomotives. One “teeters” on a young oak spray very near, and ripples the air with his sharp cricket-like voice and rapidly vibrating tongue. What a wee bit of feathers to wing his way so far from his Southern home, and what an interesting journey, if the true history of it could be written!

At what particular date did he first feel the migratory impulse strong enough to begin the flight northward? What dooryards did he visit; the streets of what villages or cities did he forage through? Is this the locality he has remembered, and where he intends to build his nest, or has he, under his chestnut crown, the memory of a snug little spot a hundred miles farther east or north? These are some of the questions that are put to my adventurous little stranger, but he only lifts his head and shakes from his ashen breast the answer into such broken fragments as to make it altogether unintelligible.

In company is one bird with the same family resemblance, but with such different specific man-

ners and markings that it at once attracts attention. Directing the field-glass, my only weapon, toward it, I find it has a yellowish streak above the eye, two broad dark bands and a medial light line over the crown, gray above, with breast thickly spattered with black, mud-colored spots and stripes. The tail is quite short, and slightly forked. It seems unwilling to use its wings, its long legs enabling it to keep a few yards ahead of me. Sometimes it walks slowly when passing through high tussocks of grass for seeds and insects, then it will hop along swiftly like other sparrows, or jump up to glean the seeds of last year's heads, or run away like a sandpiper when it suddenly be-thinks itself that it is too near for safety. As I follow it closely, it at last becomes uneasy and suspicious, and finally takes to its wings, alighting in a low apple-tree some distance away, where it remains a minute or two in silence, to reflect upon the situation before again descending to its terres-trial pursuits. It is the Savannah sparrow, and is the only individual seen, as if it had in its migration been blown away from its fellows and had fallen in the midst of these social chippies, that appear not at all displeased with the distin-guished stranger.

The little cheebeck, though he arrived nearly a week ago, forces himself on my notice for the first time. As a musician, he is not a success. He perches on a twig overhead and utters his monotonous note, chebeck-chebeck, jerking his head and tail at the same time, as if it was the greatest effort for him to say as much as this. He has the air of a sick bird, till you have looked into his round, full, bright eye, when this impression is at once dispelled. So far as I have observed, he does not capture the flying insects, like his cousins, the pewees and kingbirds, but flits from tree to tree, without returning again to the same post of observation. Once or twice I caught him looking among the leaves and twigs for food.

What peculiarity is it, in the constitution of a few of our birds, that causes an entire change of color in their plumage during the breeding-season? Evidently there is some special quality in the nature of the blood that sends the dye-stuff out to the feathers, as air and light operate upon the young leaves of the oaks and walnuts at the time of their unfolding. A male goldfinch flutters up from the pathway, apparently disabled by the unusually backward and severe moulting, and tries to hide himself among some yellowish, stained

stones, which harmonize nearly with his own hue. After much awkward scrambling, I capture the nervous little fellow, and pause to note carefully his changing suit. The wings and tail have become quite black, yet on some of the feathers there remains the brownish tint which characterizes his winter dress. The black patch, absent in the cold season, is beginning to appear on his crown ; the tips of the yellow feathers about this region are washed with some dark coloring matter, showing that the designer marked in outline the general pattern before completing the work. The yellowish-gray and ashy-brown plumage of the rest of the body is fast ripening into lemon. Not only are the feathers changing, but the bill, which is grayish during his nomadic months, has now become flesh-color, previous to its passing into buff-yellow, seen in his full summer uniform.

Here a quartette of these birds have just perched on a spray of arrow-wood, as if it had suddenly burst into yellow blossoms, and give me a song. Possibly they may not have practiced together a long time, for they seemed out of tune, and I could not understand the words ; yet they have remarkably good voices, that much resemble the canary, to which they are closely connected. With what

easy stages they approach the stream, now hopping down a twig that grows there for the purpose, now nicely choosing a convenient stone to step upon, and finally plunge into the water and revel in the baptism. After a while they retire, uttering their *ta-ché-ter-che*, as though that note was the motive power which governed their undulating flight, the second syllable being emphasized as they begin to rise on each succeeding wave, and growing fainter with the downward inclination. I believe none of our common birds "set up housekeeping" so late in the season as they. Six weeks or more after their arrival is spent in a round of pleasure, while waiting for some of the earliest thistles to furnish them down for upholstering their rooms.

There are scores of dime museums in this grove of hemlocks, to which on the mere asking the proprietors will admit you. One comes upon curiosities so unexpectedly here! Knock off the bark of a stump, which the weather for years has been loosening for you, and how amazed and confused appear the inhabitants, that never want the light and choose to thrive in this dank, unseemly place! How swiftly that myriapod scampers away on its thirty legs, as though the sunlight caused it the most severe pain, and hastens to seek its dark,

moist retreat to find relief! Another dark-brown species (*Julus Canadensis*), although it has so many legs that they appear to the unassisted eye like hairs thickly covering the under parts, is very slow in its movements, and thinks it finds protection in its coils. Here a gross larva of a beetle, upon which these creatures feed, slowly lifts its head to inquire the cause of this disturbance, while a slimy newt wriggles out from its crevice, where probably it was born and has since lived upon the inmates of this decayed tenement.

While I have been inspecting this stump, my ear has caught the sharp voice of a pine-warbler thrown down from some of these tall evergreens near by. He has a preference for just such localities as this; and whenever his neighborhood is approached he is sure to greet one with his eager and shrill salutation, which, after all, may leave some doubt in the mind as to its heartfelt sincerity. I remain motionless a long time under the tree upon which he is gleaning, in the vain endeavor to capture him with the glass, but the thick foliage and his harmonizing color render it almost as difficult a task as searching for the proverbial needle. His eye is on me, however, and if I stir about he at once utters his sharp syllabic protest — *che-che-*

che — very rapidly, as if he were hurling into the air a throatful of vibrating hair-springs. A moment after this performance I catch for an instant a dark speck flitting to another tree and clinging like a true creeper on its trunk and hopping around the whorl of limbs, showing the yellow-and-white under parts and the dark-green head and back.

The black-throated green warbler is here, too; his song is spun out from his larynx exceedingly fine, but sharp and piercing withal, indicating the excellent lung-capacity of the performer. It begins with the syllables *ta-te-te-te*, uttered rapidly, and ending with *sweet-tu*, long drawn out and sounding not unlike a boy's round tin whistle. Among these tall evergreens he loves to feed. Here and there through them the sprays tremble as he pecks at the tender tips and devours the insects which have flown or crawled so high to extract the early sweets. Occasionally he visits the open hard-wood growths, as if he wished to spice his usual diet with the peculiar viands that these trees afford. Standing in a favorable light, I notice that the yellow feathers on the head are liberally mixed with verdigris, the wing-coverts and tail almost olive-brown, and the throat and chin covered with a triangular black patch, clearly defined, as if a

piece of velvet of that shape and color had been pasted there.

What an odd chap is this creeper, clinging to the trunks of trees and running round them as easily as if he were climbing a spiral stairway! He is as much at home on the side of a trunk as on a bough. I wonder if he roosts perpendicularly! No bird in these parts, with the exception of the black-polled warbler, is marked nearly like him, with black and white streaks so mixed, and yet so distinct. He is a mixture of the creepers and warblers, with a voice not unpleasing in the general concert. I suspect the ^{nesting} cow-buntings are looking to see where this bird chooses his building site, for a small flock—two males and two females—have just flown into a cedar near by. These tramps have the characteristics of the human variety, roaming about from place to place, waiting to break into and forestall the homes of the creepers and other birds smaller than themselves. They are dressed elegantly, are these vagabonds; the wives with the spring pattern of drab so neatly fitting their trim forms, that they dislike to disarrange them in the common household drudgery of incubation. Their movements are whimsical and ignoble, as though they were half-ashamed of

their mean actions, and they go skulking about the woods in small companies, chuckling among themselves over their latest trick. Their behavior is in striking contrast to the Wilsons and wood-thrushes that are moving about here in a noble and dignified way — the real ladies and gentlemen of the woods.

A week later nearly all the birds have arrived. Some have only remained here a few days while on their way, by easy stages, to more northern latitudes, while other migrants have lingered longer, as if with half a mind to make this pleasant wood their home. The redstart, chestnut-sided and yellow warbler have come to stay. The Maryland yellow-throat sings, *seph-she-did-it, seph-she-did-it*, in the lowlands, and the golden crown salutes you with his peculiar chant.

The vireo begins at once his questioning *query-query-o-query-ee* in his clear, echoing, musical voice, but sounding fainter as I walk away from his circuit.

The chestnut-sided warbler defiantly lifts his head, and widely opens his beak when he sings, as if he challenged the clouds and winds to do their worst. Cat-birds are flying silently and suspiciously among the bushes. The wood thrushes are tuning

their fifes in the copses, and the valiant little tit-mice have changed their hearty, convivial notes to melancholy and plaintive pipes. There are but few of our birds whose notes are so completely transposed and voices so entirely altered, as the sprightly chickadee, when the season of love-making arrives. From the brave busybody, he has lapsed into the love-sick troubador.

Even the black-polled warbler, which is usually among the last of the migrants, has come a few days before his time, as if some distress was driving him northward. Viewing him in the distance, without a glass, he might be mistaken for the black-and-white creeper, but drawing him closer, you at once see a marked dissimilarity. He wears a head-dress much after the pattern and color of the chickadee, with a liberal sprinkling of ash among the black streaks above, and a wash of greenish yellow on the primary quills and tail coverts. He searches the cedars frequently for his food, choosing the spray rather than the trunk. Sometimes he flies out of the tree to capture some insect that has escaped his bill. He seems to examine every twig, turning and twisting his head sideways and underneath the limbs, with the most exquisite grace, as he continually climbs towards

the topmost branch, from which, after reaching it, he suddenly flutters downward through the leaves, like a wounded bird, to begin another tour of inspection.

The general observer and, sometimes, the ornithologist is apt to confound one kind of bird with another in this family of wood-warblers, on account of the similarity of color and marking; especially is this the case with the females of many species. There are quite a number of these little lady birds of different genera even, that are dressed in olive, green and yellow, and unless one notes carefully the minute characteristics, such as the form of the bill, the shape of the tail, the length of the wing, etc., he will often be led astray. For example: how much the female Maryland yellow-throat resembles the female of the black-throated blue warbler that has just now arrived, and is feeding among the willows. The sexes in the genus *Dendroica* are usually of the same marking, the males, however, being of a brighter color, as though Nature had given them higher rank; but in this species (*Caerulescens*) there is a striking exception to the general rule; the male is very different. He has a grayish-blue back and crown, the sides of his head and his breast are of the deepest black, in contrast to

the immaculate under parts; while his wife is olive green above, and yellowish beneath.

There is a peculiarity in their movements when you come to know them, though it can hardly be described. These seen to-day confine themselves to the lower branches; oftentimes starting from the trunk, and hopping along the entire length of the bough, inspecting every square inch of bark, till they come to the farthest spray, where they flutter among the leaves, and revel in the banquet of insects spread out before them.

One can scarcely hear their note, it is such a ghost of a voice; a mere whisper, as if the reeds in their clarinet wind-pipes had become disarranged and out of tune. The yellow rump has much the same kind of bronchial trouble.

Halting for a moment, in my rambles, to admire this pretty picture of red columbines that have grown in a crevice of a ledge, and blossomed in such brilliant relief against the gray moss, I am conscious of a small bunch of feathers moving along the branches of a young oak near by. It is the blue yellow-back warbler. Linnæus and Bonaparte examined him early in this century, and labeled him *Parus Americana*, probably because they fancied his manners were more like the tit-

mouse or chickadee than any other member of the family. He is not so restless as many of his cousins are. As he stands on the limb, his wire legs braced to reach for an insect in a bunch of young leaves, I observe his uniform. An ashen coat, with a patch of yellowish green on the back, and a bright yellow breast marked with a rather broad stripe of chestnut near the throat. Why he does not have a liking for the woods in eastern Massachusetts, after May, but hurries Northward to make his nest, is a mystery that he has not yet communicated to man.

From the edge of the wood I look out upon the meadow studded with dandelion blossoms ; a green carpet on which is scattered myriads of gold pieces. It is a pretty scene with robins and grackles moving about to enliven it.

Why was this common thrush of ours called the robin? Perhaps the early colonists gave him his name on account of his reddish breast and familiar habits, which reminded them more than any other bird here of that sociable little creature of the dearly remembered fields of England. Mr. Ruskin in describing his robin at home has also given, perhaps without knowing it, a very good picture of our bird “as he foots it feately here and there”

over the fields. But if the redbreast of England "is the pre-eminent and characteristic hopper, so light and swift," ours is the foremost, as a runner and glider. How quickly and gracefully he measures off a rod of meadow land ! He is as different from the awkward, noisy jackdaws as the proud field-marshall beside a company of lumbering, heavy-footed soldiers. He appears to treat everybody with lofty airs, and has a peculiarly indifferent manner, when searching for his food, which you half-suspect to be assumed. His head is proudly uplifted the most of the time during his rambles, as though he did not like to be caught in such a lowly occupation as hunting for worms in the sod. Here he runs directly up to a burrow, as if he had been drawn there by a magnet, and remaining motionless for an instant, then drops his head half-way to the ground, apparently to listen. Having made up his mind that the succulent game is at home, he gives a quick stab with his spear, and draws out the wriggling prey, which is immediately swallowed. He has the curious habit of turning off abruptly at right angles, or retracing his steps a yard or two, as if he had just recalled to mind a spot where there was likely to live a squirming tid-bit.

But what a funny piece of work these grackles or crow blackbirds make in hunting for their food ! How much their actions resemble the tame, mischievous magpie ; hopping up with a slight fluttering of the wings, and falling down on the victim with the tail spread, and long slender legs hanging down ; turning their heads in the queerest way ; peering into earth-worn burrows, pecking under the edges of stones, turning over, with their dextrous bills, the dead leaves, and screwing themselves into the most grotesque postures, while straining at a large fat grub, after the manner of a dough-overloaded chicken. All at once, at a given signal, and from no cause that one can discover, they are off with a whirr, sounding like a hundred gates turning on rusty hinges. Considering them as related to such a celebrated family of singers as starlings and orioles, one is surprised to hear from them such discordant notes ; yet on certain occasions, and as if they had learned it from the redwings, you hear their *gur-gle-ee*, the last syllable long drawn out, and very musical and dreamy.

Nature, when she had reached the plan of the sub-family of *Icterinea*, and the particular species of the Baltimore oriole, after painting the head and wings black, suddenly paused in her work,

bethought her of the song she was to put into its throat, and went searching among her many tints for a color to match it. She finally selected the beautiful scarlet-orange, and it is no wonder that Sir George Calvert, the first Lord Baltimore, for whom the specific name is given, chose this hue for his livery.

Although a fitting bird to survive, and having an impressive identity and character, there is some kind of agency at work which makes the oriole a comparatively rare bird. He is not so abundant as others of his relatives that visit New England, excepting the orchard oriole, which is an occasional visitor in the most Southern districts. The bobolinks outnumber him ten to one, and the red-wings are in almost as many swarms as he in couples. Certain it is that he has not the fighting qualities of the robins, who now stare at him as he flashes down in their midst, and therefore is not so capable of defending himself or his property. And may not his brilliant plumage offer a shining mark to the many birds of prey?

His song, when he first arrives, has a shade of sadness in its intonation, the preliminary chirp sounding like that of a lost chicken; then, after drooping his head in a dejected manner, and paus-

ing an instant, he begins the next syllables, which to me are interpreted thus: *Ple-pu-pu pu*; the last seeming to be uttered more rapidly, and having the very expression of pathos. Weeks afterward, as he sails over and alights in the meadow, the tones are different, being now a cheerful ringing whistle, full of semiquavers at the conclusion, and difficult to put into any kind of words. The notes vary in individual birds. Passing across the Adams' field, a half-mile away, with the sudden transitions of the last still lingering in my mind, I am surprised to hear in the walnut-tree, notes entirely unlike those to which I just now listened. *Che-er-chew chewit-chewit*, he seems to sing, yet not without the usual quirks, which would require a vivid imagination to arrange into articulate discourse. After the season of incubation, when chance has taken him quite a distance from his home, his song is not so elaborate or prolonged. Sometimes he appears in the deep woods, remote from dwellings, with only a single plaintive note, as he moves along the higher limbs, and if startled utters that peculiar guttural sound which reminds you of the blackbird, and betrays their close relationship.

His flight and general make-up resemble those

of the other genera in the family. The range, while upon the ground, is not extensive, and if he moves any considerable distance he uses his wings. He hops, instead of the usual walk of many birds belonging to this group. Once I scared him away, and at the expiration of ten minutes he was back again nearly in the same spot. He has the curious habit of turning first his right flank, and then his left toward me, at each skip, which is done no doubt, the more readily to see what I am about. Now he hides his head in the grass, and digs in the mud with his sharp, stout spade for beetles and earth worms, which are an agreeable change of diet to the usual canker and tent caterpillars.

What skillful beaks these birds have in weaving the pouch for their nests and fastening them to the tough, pliant branches of the elm! They have turned the twine-makers to good account, and their crocheting, though it is laughable to note the irregular and unsystematic manner in which it is performed, is a remarkable piece of work. How wonderful, too, that they should have the intelligence to reason that, in times of high winds, these flexible twigs will stand the test! Notwithstanding this precaution, their children oftentimes get too much rocking, for the storm becoming angry,

when left alone with the cradle, is apt to overturn it, and throw the babies headlong on the cold grass to perish before the nurse has furnished them with the customary suit of yellow flannel.

How fragrant are the blossoms of this virburnum! Its numerous compound cymes are spread out over its top, like round tables whereon are set innumerable silver urns, filled with delicious nectar. Hither the different orders of insects have been invited to partake of the bountiful repast. The various families of hymenoptera are here, the bees and wasps of high and low degree, noisy and intoxicated; representatives from the uniformed nobility Lepidoptera, the butterflies and moths, have condescended to attend the banquet; while the ill-mannered blue-bottles and mimic wasps are buzzing around in their midst, lapping up the remnants in refused goblets. Suddenly a singer arrives upon the scene, and scatters the wine bibbers in every direction. It is the yellow-throated vireo (*Vireo flavifrons*) who has just flown from a grove of oaks and beeches hard by, where for a long time he has entertained me with his truly sylvan notes. His cheery voice is more frequently heard while he is moving about in the high trees. Certain it is that when listened to from such situations the effect

is more pleasing than when he is near you in the undergrowth, which he often visits to catch the winged insects which are his principal food. In more elevated positions, his song has an additional echoing sound, which is indeed charming, and possesses the very spirit of the woods. *Creé-ra-6-creé-ra-queér-ra*, he says, as he moves along the branches, occasionally pausing to struggle with a nimble insect, which his sharp eye readily discovers among the leaves. This same bird has odd freaks however, and if you come upon him at such times, you will be apt to lose your previous exalted opinion of him, and learn that he has an uncouth side to his nature, which nearly counteracts the effects of pleasant sounds, usually heard from his throat. He is a real Paul Pry, and is so imbued with curiosity that he seems impertinent, and will chatter away at you by the hour, in such unpleasing, scolding notes that you wonder how he can manage to produce tones in such disagreeable contrast. As his specific name would imply, his front is yellow, extending down almost to his legs, and then ending abruptly in a clear, bright white, which is the color of the rest of the underparts. Above on the head is olive green, changing into ash toward the tail, and having two white bands on the wings.

How kindly nature has looked after these fly-catchers! Beside the quick eye and skillful wing, she has provided another contrivance by which the birds can capture with greater facility their victims. In the family of wood warblers, vireos and tyrant fly-catchers she has furnished, either abundantly or sparingly, bristles, which are situated at the junction of the upper and lower bills, and on the lores, and which act as a sort of *cheval de frise*; so that, if the bird fails to seize its prey at the first attempt, it may become entangled within the trap and recovered. Some of the species in this family, however, have these rigid hairs very much reduced, or they may be entirely absent. Individuals without these appendages, it is interesting to observe, are worm, caterpillar or spider-eating birds. The black and white creeper for instance, has short rictal bristles, consequently he inspects the bark for grub, oftener than he flies to seize his food. The Maryland yellow throat prefers the fat spanners. Some species in the genus *Dendroica*, as the myrtle, or yellow-rumped warbler, and the yellow warbler are quite expert in the art of catching flies, accordingly the stiff hairs at the gape are longer and more advantageously arranged, while in the genera to which the Canada fly-catcher and

the American redstart belong, the rictal bristles are nearly the length of the bill, enabling these birds to sweep into their nets with admirable dexterity gnats and other small fry upon which they feed. The family of goat suckers, to which belong the whip-poor-wills, night-hawks and bull-bats, offers a striking example of the way in which these rictal bristles are developed; some species having not only very long ones but lateral filaments attached to them, thus forming a perfect net, to entrap the twilight and night-flying moths.

A lively note is heard in the edge of a birch thicket. For a long time I have been interested to know from what kind of throat it proceeds. It strikes on my ear at the most unexpected seasons, and in entirely different localities. What a peculiar song it is! Whew! whew! whew! It chirrups at first in a clear, delicate, sweet whistle, long drawn out, and then *de-de-de-de-de-de-de-de-de*, uttered faster and more indistinct at the close. Presently the bird is seen darting into a clump of cat-briers in which it is playing a game of hide-and-seek. After awhile it flies boldly out of the tangled mass, but, seeing its interviewer close by, rustles quickly back. Stooping to look up through the brambles to obtain a good view of the stranger,

a pitiful spectacle is presented to me. If an artist had been here to have caught the spirit of the scene! A dead bird arrested by the thorns as it was falling to the ground, its limp head resting on a bunch of young, tender leaves, and its wings outstretched for the last time. This I suspect is the work of the cruel shrike, although no marks of violence are seen on its body. Those black and white stripes, clearly defined on the crown, so different from the markings on the back, signify its connection with the genus of finches called *zonotrichia* or "striped heads." The yellow streak from the base of the bill, along the cheeks to the middle of the eyes, the white throat, and bars across the wings, distinguish it from the other species of the group. It is the white-throated sparrow or Peabody bird, and this is its mate, no doubt, now perched overhead, that I have followed to find bereaved. Were these birds belated in their journeyings to more northern woods, where the white throats generally visit, or were they prospecting for a home in this bush?

By the last of May every bird is in full song. The cat-bird medley to his lady-love is a poor performance when compared to the finer efforts of his southern cousin, the mocking-bird, and it is comical

to hear him stammer through the lesson he has so imperfectly learned while away in his winter resort. He catches the intonation of the robin perfectly, and this seems to be his own opinion, for he recurs to it very often, but forgets more than half the notes of that singer, and immediately lapses into a mess of gibberish that you can make nothing of. Yet he is so honest and persevering withal that you feel compelled to applaud, even while laughing at his blunders.

Half-hidden in the midst of cornels and arrowwoods, I take my position to observe the different musicians as they come to bathe and clear their throats. What voice is that uplifted a quarter of a mile away? Not a robin's, surely; yet it has in it some of its intonations. Nearer and nearer it sounds, until I have caught the words, 'Tis very queer, very 'cute; as if the artist had witnessed some extraordinary exhibition or performance and could not restrain his expression of surprise and admiration at the spectacle. Presently a bird flies among the top-most branches of a white oak, like a firebrand blown from some burning mass, and gives his discourse in pure, rich tones which correspond to his gorgeous dress. His manner, however, is quite unostentatious, for he spends much of his

time while singing in search of insects among the leaves, and is apparently unconscious of attracting any attention. He pauses frequently in his assertions to capture a crawling dainty, but takes up the burden immediately afterward and carries it through to the end. Once while singing he suddenly stops at the third syllable, apparently to listen to some far-off sound, and not till he has been convinced of its import, which occupies him a number of seconds, does he conclude the refrain with a relish and peculiar expression noticeable in persons who have recalled promptly a good thing almost forgotten. Now he flashes down through the branches and lights in a shallow part of the stream to moisten his fluted throat and enjoy a refreshing bath. As he dips himself in the cooling water, I almost expect to see a puff of steam rise up, or a spot of carmine drift past on the current. His extremities, the wings, legs, and bill, are black, as if the fire-bearer were undergoing the cooling process, and the thinner, smaller parts had been first affected. Now he hops on a bush to preen his bright feathers and shake his wings.

What a knack all the birds have of fixing themselves up after washing! Their beaks are many tools in one. Besides the chisels, picks, shuttles,

and fly-traps, they are most excellent combs and brushes. Giving his dress a few finishing touches, he utters in a suppressed tone the word *queer* as the key-note to the roundelay, and then mounts the gallery and goes flying up and down its length, making the arches ring with his merriment.

The tanager is a rare visitor in the woodlands hereabouts, and appears to have come by accident beyond the usual parallel. If he is alluding to the color that Nature has painted his wife, his words are indeed significant. I make her acquaintance for the first time after much maneuvering and circumvention, as she moves silently and by easy stages through the young foliage, toward that exultant call, and am struck with the appearance of her dull and faded coat. Dusky olive above, with greenish-yellow underparts. Is it not "very queer" and "very 'cute'" also, on the part of the old Dame to give her a garment that so nicely simulates the bark and leaves at the time of her nesting? For if her color had been like that of her mate — a brilliant carmine — how quickly her enemies would find her out.

The male, during the season of incubation, seems to be aware of his glowing hues, for, it is said, he seldom visits his home, "or approaches it when

necessary, with a great deal of caution, lest he should betray his presence."

A few days after I went again to see my bird, but not a hide or feather was visible. Had he become more adventurous and sailed a degree farther north, or disheartened and so retreated to southern New England, where company could be had for the asking? Or was it probable that he had come to some untimely end? Death, more than likely, in the disguise of a flesh-covered taxidermist who loves such shining marks, had stalked abroad, and, heeding not the gladsome strain, had gathered him into his coffers.

Once in my visit to the woods I met one of these "kings of terrors" among the birds, a cold-hearted young man improving his short respite from study, and gratifying his besetting passion.

He was an unerring marksman, for he had in a leather bag four or five kinds of dead birds, which were carefully enshrouded in nice white paper cornucopiæ. These he politely exhibited, carefully undoing each parcel, and drawing out his victims with an air of such anxious solicitude that it would have been comical had not the occasion been so sad. Upon inquiring if he had no scruples in regard to bringing down so many heads and mothers

of families, and banishing the hopes of lovers, he turned on me with surprise and coolly laughed.

The field-glass was a superior instrument to his gun, I thought ; and the live bird, brought so near that I could observe its actions, was better, in many instances, than the stiff, unnatural stuffed model.

It is a sacrilege to rob the nest of warblers, flycatchers and thrushes, and to shoot them down mercilessly, for the sake of the mere money that such prepared specimens will bring. The different aviaries, museums and rooms for scientific study are the only places where samples should be on exhibition. Let the art of painting them supply the ornaments in our households, and the milliner's ingenuity devise some other embellishment than dead vireos, bluebirds and tanagers.

WOOD NOTES AND NEST HUNTING.

IV.

WOOD NOTES AND NEST HUNTING.

PASSING along an old dam, now unappropriated and neglected, where, on either side of it, trees have since its building grown to maturity, now watching for awhile the adventurous bream which approaches the shallow water for gerris and water-beetles, and whose motions appear to be dull and heavy by the surfeit of this continual feast, my eye is arrested by another insect-catcher of the air, the wood pewee. With what unerring precision it darts upon some aspiring beetle, and returns to its observatory on the opposite shore!

This bird is not shy when engaged in its legitimate pursuits, and will allow a very near approach. His head is continually moving from side to side; he occasionally stops, however, to preen his breast feathers, which seem to be always ruffled, or with uplifted claw to give his crown a series of quick, spiteful digs, and with droll performance peer un-

der his outstretched wings for a troublesome parasite. Now he darts off, flying fifty yards away in a straight line, to gobble an insect which he sees at that distance, not returning to his post, but to a sycamore growing on the dam. This is the season of incubation, and I suspect, considering the good provider and kind husband that he is, that this tid-bit just captured is for his consort.

No one, without the aid of the bird, could expect to find such a nest. How nicely it is saddled on the end of a horizontal bough, thirty feet from the ground, so shallow that one can see, even at this angle of vision, the head and back of the female as she sits upon it. The couple did not wander far for their building material, for the nest is chiefly composed of mosses and thin plates of old bark that cleave from the young growing liber, so characteristic of the buttonwood, glued together with saliva, which Nature has so bountifully supplied to many of the birds. There she sits, evidently not caring whether her nest or her presence has been discovered. Her head moves about freely, and once she cannot resist the temptation of flying off to seize a passing insect, but returns immediately to her task. Here comes the male once more, and standing close beside her gives a kiss and a

beetle in the bargain. He breaks it to her very gallantly, while she, as is her prerogative, receives it with cool indifference, and bids him go for more. As he stands on the branch an instant, his back toward me, and the broad leaves, uplifted by the wind, let in a sunbeam upon him, I note a shade of dark green, and the long pointed wings, reaching down half-way on his tail, which is not so deeply forked as is that of the olive-sided fly-catcher, a first cousin, whom he otherwise much resembles. When he rises I see in this individual an exception to the general dress of the under parts of this species. The pale yellowish tint of the breast is replaced by whitish ash. The song is not often heard, as if he was aware of the melancholy strain, and had the good sense to consider the feelings of his mate during the distressed period, and worked for her crop's sake instead. Resting on this slope in the shade of the beech-trees, watching the gambols of a pair of large purple-black butterflies (*Vanessa antiopa*) flying high up among the trunks, attracted there, no doubt, by the nectar that exudes from the bark, I hear the energetic notes of the oven-bird or golden-crowned thrush (*Siurus auricapillus*). Immediately after a little bunch of feathers drops down from a low branch, and goes peck-

ing here and there on the ground, not a rod from where I am sitting. He takes long, quick strides, as he turns his head to look at me, now half-tumbling over dead sticks that lay in his path, or getting his long hind claw tangled in the blackberry vines, and making little exertions to clear himself. Now he runs swiftly ahead to capture a beetle, or turns back quickly sideways for some crawling dainty which nearly escaped his notice. How much the color is like that of the leaves and grasses and vines through which he forages! The upper parts are of dark olive-green, with two dark streaks on the crown, and a broader brownish-yellow one between them, with the breast and sides of dirty white, streaked with black.

I believe not many of the birds sing while upon the ground. They love to mount some kind of stage, on which to pour out their melodies. But the golden-crowned hardly thinks it worth his time to take the pains to fly to a music stand whenever the inspiration seizes him, but stops his feeding for a brief interval, lifts up his head an instant before commencing, as is the habit of some of our best singers, and utters in a loud clear tone the syllables *Cheat-er cheat-er cheat-er*. The song is not like any other in the woods. Listening to his lay at

noon-time, when the sun's rays are pouring down on the mosses, one imagines it is not so sprightly as in the morning. There appears to be a dragging of the notes, as though the little songster was worn out with the heat, and although he may be very near you in shade, the first syllables seem to come from a distance, showing his great powers of ventriloquism, gradually sounding nearer and louder, until he reaches the climax. This is his commonplace humming after all, for Mr. Boardman, a close observer of the birds, says he has another song at times, so rare and beautiful that but few know it as from that bird.

His nest is not far from here, for when I happen in this vicinity his song is sure to be heard. He likes just such a place as this — shaded slopes near a stream. As you walk along you see hundreds of depressions, little hollows under the roots, crevices in the ledges, and hide-away places generally in which you would choose to locate a nest, but thus far it has escaped my search. How shrewd these birds are in concealing their homes, not only from the sight of man, but often, as they must, from the sharper cow bunting, whose special instinct it is to intrude upon them, and from the numerous greedy prowlers that go nosing round,

both night and day, for just such morsels as the nests of these ground-builders offer.

The general intelligence of birds, considering their comparatively low position in the scale of creation, seems to me remarkable. How alert they have learned to be on account of these surrounding dangers! How many little schemes they invent to deceive you! This same golden-crowned is a curious bird. He likes to be near you, though he does not want you to be aware of it; so he flies swiftly past, far enough, he probably thinks, for you to lose sight of him, when he makes a detour, and finally comes back again along another air line, and flits behind a rock a few yards away, with the probable satisfaction that he has completely outwitted his vexatious follower, and can watch you at his leisure without being observed himself.

It is amusing also to observe the acuteness of these crows, whose young are nested in a tall pine near by. Only a stifled suppressed scolding croak escapes them now, as though it was hard for them to keep in so long. If they could give a few loud disagreeable caws it would be such a relief; but it behooves them to be silent, that their enemies' attention may not be directed to this one place on earth wherein is centered all of their affection.

Two small birds, with ashen heads and oliveaceous backs, and breasts of reddish-yellow, flutter down as noiselessly as butterflies, close to my rather uncomfortable position in a patch of green-briers and blackberry vines. They have taken me by surprise, and almost before that feeling has been replaced by inquiry they have moved off again in their nervous way, flying in all kinds of places, now down to the ground, or zigzagging among the shrubs, or smacking with their bills among the leaves, as they glean in the highest branches of the elms and willows. At length one, with undulating flight, wings its way to a small cedar, and hides in the thick foliage. The movement is so different from the usual manner of proceeding from bush to tree, that one suspects a subject of great importance possesses the bird, and watches sharply for developments. Sure enough, there in the horizontal fork of a limb, not fifteen feet high, the American redstart (*Setophaga ruticilla*), the red-tailed insect eater, has laid the foundation for a nest. From a human standpoint, the locality is not well chosen; situated as it is quite near a wood-path, and in full view of every young rambler who may feel disposed to rob. Though placed in this opening, how nicely the general

colors of the material of which it is composed harmonize with that of the bark of the limb! No one without the aid of the bird would discover it, it is such a wee bit of a construction, and so accurately fitted among the smaller twigs. How busy the little worker is! Though taking observations quite near, she does not appear in any way disconcerted, but works on as if her very existence depended upon completion of the nest in a given period of time. Here she tugs for a bit of lichen, which will match well with her home surroundings. There she flies down in the swamp for a particular bit of sodden last year's plant-stem to suit a certain defective place in the side; she knows where it belongs. The dead branch of a willow, almost denuded of bark, which the rain and sun, year after year, whips into fine cottony nesting stuff, offers material, and to this she often goes for rift-ing pieces. Half-flying and hopping along its length, she searches for a loose end, and when it is found, stops, and having secured a fast hold with her beak, gives a sturdy upward pull, which evidently requires all her strength to remove the bleached strip, and flies with it to her home.

She always builds from the inside, never placing material on the nest while standing outside of it.

The cavity must be looked after and nicely turned and pressed to fit her precious little body, so she gets in and squats and turns round and round with out-spread tail and wings, tucking in here and there, and fastening with saliva the stray ends, and hugging with her chin and bill the outside edges against her breast. The delicate structure is progressing rapidly, and the female appears to be the chief architect and worker. If the male comes, it is only to flaunt himself before her and disappear. These are evidently young birds, for on the occasional visits of the male I notice the color is similar to his wife. His tail coverts and tail, however, are darker with perhaps a deeper orange-red on the sides of the breast; he will have to wait a year or two before he puts on the uniform of black and red that older male birds wear.

In a week the nest is finished; the upper parts are slightly drawn in and compactly thatched. Now that the task is off her mind, she appears more cautious, and uses many little devices; fluttering among the lower branches or flying into the farthest side of the tree and skulking up to the nest, with the hope that her skillful maneuvering has been successful in eluding my vigils. As I approach the nest she utters a sharp *Chip, chip,*

precisely like the note of the hair bird, but does not manifest any extraordinary signs of distress. She remains at her post of trust till the last second, and then eyes me keenly from one of the branches above, as if she had the conscious power to prevent me from stealing away her home. It is a deep cavity, upholstered with fine grasses and a few horse-hairs, on which rest already two tiny eggs, the ends of which are very unequal, tapering quite acutely from the larger part. The ground color is white, blotched with reddish brown, as if the bird had rubbed on them some of the coloring of her breast. I dare not breathe on the sacred things lest the parent consider them polluted, and forsake the dearest spot to her on earth. No fear of her! Sensible to the last, she seems to have comprehended the object of my visit, for hardly have I withdrawn a reasonable distance when she again flies to her nest, and with a cant of her head, as she stands on the edge, says : " There, you big fellow, I trust you are satisfied with your investigations. Now leave me to finish my work in peace."

In this thick clump of high blueberry bushes, interlaced and overgrown with greenbriers, Madam Cat-bird has improvidently made her home. While

looking through the interstices of leaves and sprays from the other side, to observe the devoted actions of the pair, I discover another oölogist, but with more hostile intentions than the writer. A small striped coachwhip snake has laid the several portions of its lithe body conveniently along the twigs and there remains as motionless as any part of the bush. After watching it for a time, I make various noises to ascertain to what extent it can be affected by sound, and seeing that it does not stir from its resting place, I slightly shake the bush, when it lowers its head, darts out its forked tongue, but seems unwilling to move. Nature has given to its skin the general hue of the bark, and probably it instinctively remains in this position, relying more for protection on the harmony of color and being at rest than upon escape by any other means. Just as I am about to take more vigorous measures for its removal, the bush is struck by a sudden breeze, which appears like a palpable intervention, while the serpent takes advantage of it, and glides through the tangled mass out of reach.

The cat-birds hereabouts are as abundant as robins in the meadows. An hour's search would, no doubt, bring to light half a dozen nests. That cat-like mew is a curious note for a bird to sound;

the "Maltese" color withal has a strange, uncanny resemblance to the felines, and you almost expect to hear the peculiar hiss whenever they are disturbed; dispositions differ, however, in individuals. I have startled from her nest a female that remained unusually quiet; even as I put my face within a foot of her beautiful emeralds she only looks at me solicitously from a neighboring bush. Curiously enough her husband is like her. Perhaps this is an experienced pair, that have had many adventures with heartless oölogists and wood-faring boys, and thus realize the utter uselessness of making a bustle over the affair.

An interesting exhibition of a swarm of gnats, just out of their pupal state, playing up and down over a particular stone in the wall like jets of water in a small fountain — dispersing instantly as I strike my hands together in their midst, and reappearing over the same stone, again to commence their sport — has engaged my attention, and furnished a side-entertainment, so to speak, until a bird-note to which I had never before listened reaches my ear. At first it is heard at a distance, but, as the singer approaches, the strain is rich and clear, and I become absorbed in the melody. Presently a bird flies from the copse yonder to a

tree near by, and, with the positions of serenaded and serenader reversed, pours out a heart-song, in six short stanzas, uttered at intervals of half a minute, which is interpreted thus :—

“*Chee — cheer — cheer —
Chip along — cheer — cheer!*”

The words are pronounced with the tongue of a foreigner, it is true, and seem broken ; but, considering the artist's recent arrival from Guatemala, he has succeeded admirably in mastering the language. At first, the song is begun in a low tone, as if the musician were doubtful how he might proceed ; but, as he advances, it reaches a rapturous climax, and then falls down into the commonplace ending almost as it began, faltering and inarticulate.

Looking up, I see a spot of white, red, and black among the leaves. Although I have seen the bird at a distance many times, this is my first real introduction to the rose-breasted grossbeak. Knowing what he is after, I seek a covert to allow him free use of the stream, on the banks of which he soon appears, and, wading into the depths, where is reflected the carmine on his front, scoops up with deep, broad bill the water needed to clear his

throat after such a fine performance. He is a rare minstrel in this woodland, and, indeed, throughout this part of New England, not more than a pair or two appearing or being established in the same locality, which is generally near a stream of water or in the neighborhood of swampy tracts, for these birds are consummate bathers, and love to have houses with convenient bathrooms attached.

Indeed, he is so full of life and good cheer that he is fairly running over with music; one is reminded of the bobolink, which probably is the only bird hereabouts that surpasses him in spinning out his melody to such a joyous length. By his reckless, imprudent singing he leads me into the thicket and directly to the tree whereon his nest is placed. A small, pliant birch, easily bent by every breeze, supports a mere bunch of sticks that appears to have been lodged in the branches by accident; and over this rude structure, which he calls his home, he has been tuned to sing its praises. It being such a simple nest, either the male or female must be on guard to prevent the eggs from rolling out. During the period of incubation Nature has told the husband to relieve his wife occasionally of the household services, but has evidently forgotten to bestow one apparently essential quality — that

is, silence. He is hilarious, even while engaged in his responsibilities, and thus, by his incessant singing, is apt to betray his presence to passing marauders. How curious are the ways of Nature, in this example of the male sitting on the eggs! I believe not many of our birds have this instinct, although the husbands are usually thoughtful in providing their mates with food during this tedious season.

As I bend the slender tree, and stand on tiptoe to extract an egg from the shallow cavity, his joyous note is changed to one of anxiety. If you pause, however, to analyze it, you will find nothing disagreeable in his alarm. He cannot scold you away, for his larynx is not formed to produce harsh sounds, like the cat-bird, robin, or even the sparrow to which he is more closely related. This seed, which I trust will blossom into a rose-breasted songster, is rather large for the size of the bird — firm-shelled, and colored similarly to many of the finches; namely, a dull, greenish-blue, covered thickly with light-brown blotches. What a pretty thing is a bird's egg, so exquisitely moulded, so uniquely painted and figured by the handiwork of Nature, and presenting such a nice adaptation of means to the end in view! What harmony and

wise designing of the propagation of birds is seen in this delicate structure! If their manner of breeding was like that of mammals how soon would the feathered tribe become extinct! These mature ova are deposited in nests "that serve as external organs, indispensable to the development of the immature young." Lightness of body must be looked after, that they may be enabled to fly through the air, or move among the branches or on the ground with that quick, alert motion, so characteristic of these creatures, and so necessary for them to capture their prey.

The female is dressed in a much plainer suit of brown. Two white stripes, one above and one below the eye, are all she can boast of as head ornamentation, with some sprinkling of saffron about the wings. She is a wise-appearing bird, and does not wear her heart upon her sleeve like her unwary husband.

It would be interesting to know the circumstances under which Linnaeus classified our rose-breasted grosbeak, and gave him the name by which he should be known thereafter to all the nations of the world. The generic *Zamelodia* signifies singing melody which is very appropriate; and the specific "*Ludoviciana*," Louisiana, or re-

lating to Ludovicus. It is likely that Louis the Fourteenth was meant, as that King of France took much interest in scientific matters, and invited many of the leading men of science of his day to visit his country. Among them was probably the great Swedish naturalist, who named the bird partly after Louisiana — which was at that time a more extended province than the present State, and where these beautiful songsters are plentiful — partly out of respect for the French monarch, with whom he must have had pleasant associations.

But it seems pitiful thus to break in upon this brilliant songster's happiness, and detain him so long in the present exigency; so I move out of his way, after teaching him a lesson — which he, no doubt, will soon forget — that silence, at the proper time, is the better part of wisdom.

This low ground, where the swamp-roses and tall meadow rue blossom in profusion, is the favorite building-place of the Maryland yellow-throat. Here is one at this moment, the female, moving among the bushes apparently in an anxious state of mind, now darting in and out of sight, now alighting on a twig not ten feet away, her wings quivering with fright or anger, and uttering that

peculiar scolding Chip ! which expresses so much distress and solicitude, and which has the power and eloquence behind it to arrest your steps for a time, however good your intentions may be in searching for the nest. Surely it cannot be far away. The male has arrived with a spanner in his beak, which does not prevent him from chattering his discomfort at my near approach. A small bird he is, with upper parts much the color of the bark of the shrubs ; the breast greenish yellow, with a broad band of black covering the cheeks, and a narrower light one above it. This ornament the female does not have, and she is somewhat smaller.

The application and meaning of the technical term (*Geothlypis trichas*) by which the yellow-throat is designated in scientific books is, says Coues, “obscure, its only pertinence being in *geo-*, earth, signifying the humility of this bird of brake and brier.”

Keeping a sharp lookout, I see the pair flit down among the sedges, the white tops of the meadow rue trembling as they push against the stout stems, and go skulking here and there among the tussocks of rushes where their nest is concealed. Approach-
ing cautiously, and tenderly pushing aside every

culm and stem, I at last discover their home, exquisitely placed in a tuft of sedge, some of the spears of which are bent over it so as to form a regular canopy. Ornithologists say that the nest is often built over at the top, with a hole for the entrance. This one has no such contrivance, the thick, overbending sedges answering as a dome and portal. The foundation is composed of dead leaves and coarse grasses, very compact, as if the architects were aware of the dampness of the situation, and had taken the necessary precautions to prevent the eggs from spoiling before hatching-time. The cavity is quite deep and wide for the size of the bird, and has the unusual though sparse lining of horse-hair. There are two eggs in the nest, and though I read from no authority that the general ground-color should be of a flesh-tint, it is certainly true of these, the larger end being covered thickly with dark purple and brown blotches. Bending the spikes over the nest again, as naturally as a clumsy hand could perform such a delicate task, I went away, trusting that the disturbed pair had comprehended my purpose of merely looking in upon them. But it was of no use; their nice sense of the proprieties had been disturbed, and a week afterward the ogre had the

remorse of gazing into the deserted home from which the songs, confined in their little round prisons, were never to be set free.

The streams and swamps offer more attractive entertainment, at this season, than the dry uplands. Every bird in the vicinity comes here to slake its thirst and bathe. Here is a merry skating carnival of *gerris*, and a larger party of whirligig water-beetles dodging about in every direction, but never appearing to collide, as they pounce upon the drowning flies, or the twisting, jerking larvæ of the gnat. Down through the thick alders and overhanging sprays of *sambucus* the red-eyed vireo flits from water to twig and from twig to water, striking it with her wings, and sipping it as she flutters over the stream. I am inclined to believe that this may be the manner in which all birds belonging to this group perform their ablutions and quench their thirst. They are not groundlings, and shun the earth as the swallows do the foliage.

Following the line of flight with the glass, up to an overhanging branch of the willow, the object lens rests accidentally on the nearly-finished nest with the builder just arrived. I hardly dare to breathe, as I see her red eye dilate with alarm, and the quick turning of the head in every direction,

before she begins again the work of upholstering her apartment. Now she seems half-assured that all is right, and begins to peck here and there around her nest, possibly to deposit a new supply of saliva, and to see if the guys are well secured, after which she commences a series of movements curious to observe: turning around with outstretched wings and spreading tail, crouching low, and seeming to press the new material into shape. Looking at her actions for a brief space of time, one would suppose that she could not accomplish, with these movements, such a nice, delicate bit of architecture; but, as the blacksmith's light blows on the shapeless mass of iron forms it into the required shape, so every motion about her house-building has been an effective one. How skillfully she has incorporated into the bottom of the nest some of the leaves and twigs of the branch on which it is suspended, exhibiting a nice adroitness in concealing her home from the view of the passer-by!

As she flies off and alights upon a lower limb near by, eying me with an expression which is as plain as words,—“What are you doing here? You have no right to molest me,” I cannot allow the opportunity to pass, notwithstanding her

rebukes, without noticing her color. Above, a dark olive-green, and as seen from this angle, with some of the quills edged with greenish yellow. The under parts pure white, crown dark ash, and a dark streak along the side of the head, from the base of the beak, with a light one above it.

The spirit of maternity has whispered to her again, and she darts off through the thick alders, and in ten seconds is lost to view. I am surprised that she does not sooner return, for the most difficult part of her building is finished, and she has now only to collect fine grasses and pine leaves for the lining. What keeps her away? Five, ten, fifteen minutes pass, and still she does not come. Has she flown up in the orchard for her diet of worms? Just at the moment she is not expected, her flight, as noiseless as that of time, is seen passing up through the leaves, approaching her nest, not by easy stages, as many birds, but directly to it; while her mate, whom she has brought with her, has begun his *ri-re-o-cre-chit, cre-chit* in a neighboring tree.

Mr. John Burroughs, whose writings have the true sylvan ring—to read them is next to walking in the woods—says, in describing his song, that it is “The lay of industry and contentment,

and the sentiment expressed is eminently that of cheerfulness."

His brother, the warbling vireo, much resembles him in color, oftener frequenting the orchards and cultivated lands, and has a note almost exactly like the purple finch, perhaps not so clear and loud, but with the same religious intonations.

As this boggy tract becomes narrower, the land is made higher by the gradual and continual deposit of silt from the stream above, and so the cat-tails are replaced by patches of sweet flag and flower-de-luce, until finally, as you proceed, the sedges grow, and the army of elders, viburnums, cornels, alders and swamp roses have thrown out their skirmish lines, and planted their standards at the heels of the retreating columns of the aquatic herbs, which wave their swords and pikes over their shoulders as they slowly retire from the on-coming foe.

Probably in this swamp, there are more long-billed marsh wrens than can be found in any other particular locality within a radius of thirty miles, and as you walk along the shore, you scare up, at almost every rod, a pair or two of these singular birds, that show their rusty brown backs and wings, as they flutter above the reeds for half a

minute and then settle down again in their hiding-places, uttering that peculiar note, which can be compared to the piping of the tree toad—a kind of bubbling sound heard from no other bird throat.

Everything needed for building material can here be found. The stout stems of the cat-o-nine-tails furnish the pillars, on which the nests of these wrens are firmly supported; the dry last year's leaves supply the timber for the frame-work, and the bundles of soft hairs that grow on the dense spikes offer a bountiful quantity of chintzing stuff and lining. No mud is used about the nests. How long has this been an exception to the general habits of the species, and when did they learn to utilize the copious down for plastering, in place of the ordinary cement? What a curious nest! it is the size and shape of the cocoanut. On the side is a hole three fourths of an inch wide, most skillfully worked, the ends of the coarse sedge leaves well tucked in around the edges and made strong, as if these wise wrens were aware of the necessity of having the threshold especially compact and well finished to prevent it from wearing out, by the contact of their sharp claws, while passing to and from the nest. It is also a remarkable sign of bird intelligence, that over their door-

way they construct a kind of gablet or projection, so that rain may not fall within the house; and that the entrance is always placed on the southern side to protect eggs and tender young from the north winds, which sometimes sweep along this reedy plain. The habit of building their nests within a rod or two of the higher land and never far out in the middle of the swamp, also indicates a great deal of prudence and forethought. They have placed them near the shore to lessen the chances of danger to their children when starting out from their home. They must be carefully watched in their first lessons of flying. A wrong curve of the weak wing, or a failure in catching a cat-tail spike, with their feeble claws, would send them headlong into the water to perish.

The eggs of the long-billed marsh wren are five, and small for the size of the bird, not being more than twice as large as a horticultural bean, and so thickly covered with mahogany-brown spots as to almost hide the light ground-color, with a ring of chocolate around the larger end.

A long, natural hedgerow of cat-briers separates, now as I advance, the bog from the higher woodlands, climbing over and obstructing the growth of shrubs and young trees, and forming excellent

hiding-places for those kinds of birds whose instincts have taught them to build their nests away from their cannibal relations, the crows and jays. As I stand before this barricade of sharp thorns, looking down the long line of glistening young leaves, I catch a few sharp notes that are thrown down to me from a little minstrel perched in the branch of a small oak near by. *Stich-er-stich-er, stich-er-kerchief*, it seems to say, the music being violently shaken from its throat, as if a certain quantity must be disposed of before the season ends.

This is the chestnut-sided warbler (*Dendræca Pennsylvanica*), and evidently his home is concealed close by in the bushes, for he appears ill at ease, notwithstanding his song; elevating his tail and dropping his wings so that they almost touch the branch. It is curious to watch his movements. He is not at all acute in leading you from his nest, and if he resorts to any trickery it is most awkwardly performed; while many of the sharper birds have a way of dropping suddenly from their flight, and fluttering into the bushes like butterflies, a distance from their nests, and skulking up to them unobserved, the chestnut-sided descends directly to the spot, telling you

plainly enough where his home is hidden. Here, in the fork of a young choke-cherry tree, which grows with others in a clump half-covered with green-briers, the nest is placed. In it are three panting young birds, which, at the slightest noise or movement, immediately lift up their heavy, shot-eyed heads, and open wide their yellow-edged bills, waiting patiently for the dainty spanner to be put in their red mouths. How admirably suited is the posture to receive their food! Nature, it seems, could not have devised a better plan. The day-old chick is not more adroit in scratching, or the young mammal more ready to seek its fountain of milk, than these blind, helpless nestlings in adjusting their hungry little gullets to receive the pliant worm. The nest, which is composed of grasses and plant-strips, interwoven with spiders' webs, as it approached the well-turned, cup-like cavity, resembled in model that of the yellow warbler's. It is much worn. A large rent appears on one side, and some of the fastenings have yielded to the extra weight, letting it down, so that the young seem in danger of rolling out. But the birds, to prevent further rupture, have lashed the other side more firmly to the branch by passing around it many times the tough strips, and cement-

ing the ends with saliva—a commodity with which all birds of this kind are provided.

While contemplating this wonderful work the female arrives, and, though I stand within three feet of the nest, she does not hesitate to fly upon it. I move nearer, but the little mother, with valorous spirit, remains true to her trust. Her distressed, anxious expression is painful to look upon. Her dark eye dilates, as she turns it up to me in pathetic appeal, until I can endure it no longer and retire to worship her heroism and give her peace. The male now comes to present his worm-offering, which his wife receives gracefully, holding it fast, while he reaches down again, and, taking hold, draws it through his beak. This is evidently to prepare the worm for the young throats, but while I am in sight she will not stir to give it to them.

What mystery is this that gives the curious marking and different coloring to the birds? Look at his golden crown, so clearly defined against the black eye, strip, and triangular patch on the side of the head and along the throat, ending abruptly in a broad streak of chestnut on the sides, and the pure white breast. If all this has been effected through sexual selection, namely, "the more beau-

tiful males being continually preferred by the females," this warbler, since it started out thousands of generations ago a strong and improved species, has acquired a singular taste, for none of the birds in our woods are colored nearly like him. With one or two exceptions, the sexes in this genus (*Dendraeca*) are dressed much alike. The males, however, are done up in brighter colors; as if Nature had given them the insignia of higher rank.

How far back in its history did those chestnut streaks begin to appear? It would be interesting to know who among the oldest naturalists first noted this bird, and to compare his account with that of Baird, who is the authority to-day for its scientific name. Linnæus was the original describer, as far as we read in the ornithological books. He gave him the generic name (*Motacilla*) — wagtail. Although this warbler does not, I believe, have the habit of wagging its tail, it moves it up and down, keeping it erect much of the time, similar to the wrens; and so this "smart, bantam-like appearance," as Burroughs says, must have struck the great classifier.

It is in this damp, swampy woods that I hear the half-querulous, half-beseeching chirp of the

Wilson's thrush. The note is so different from that sweet, mellow hymn of his, so irritable and peevish, yet with such an expression of entreaty and pleading, that I feel sure of treading near some special tussock or bush. Not far away a tawny bird flies up and eyes me askance from behind a curtain of leaves as I search for its home. Here it is, sure enough, saddled on the trunk of a fallen white cedar. Truly the female has manifested a great deal of foresight and "mother wit," for she has chosen a place over which bends a branch with thick, heavy spray, as good an umbrella and protection from the rains and scorching rays as could have been found in a day's flight. The exterior nest, which is mainly composed of small strips of cedar bark, is trimmed with dead leaves, which hang loosely here and there about the walls, as if the bird had put them there for the purpose of simulating a wisp or shock of leaves lodged among the boughs, or because the color of them harmonizes so nicely with her own, thereby lessening the chances of being seen. The quite deep, well-made cavity is upholstered with fine grasses and roots, which give it a certain springy, elastic nature, necessary for the prosperity of the eggs and comfort of the nest-

lings. On this concave mattress, in rich contrast to the brown nesting stuff, rest three glossy sky-blue ovals, that enclose the nascent songs. How beautiful are the eggs of all these thrushes! So symmetrical and perfectly enameled and painted with the hue of sapphire! What mysterious chemistry is at work within the viscera of these brown earth-probing, worm-eating birds, that gives the lime shells such a delicate azure tint?

While contemplating the jewels, the mother bird lingers near, and occasionally utters her reprobating, pleading chirp, as if she said: "Ar'n't you ashamed, you bold-faced ogre, to look into my door? But please don't rob me of my treasures." So heeding her voice I leave her in peace, trusting that another musical family may be born, to give to the world additional melody and cheer.

Here by the wooded bank, while gathering the true and false Solomon's-seal, one having its greenish, bell-like flowers in nodding axillary clusters, the other with white, small blossoms in terminal racemes, I am startled by a ruffled grouse that has risen with explosive sound from her place of concealment, not ten feet away, and whirrs off to the woods like a solid shot. She is seen only for an instant, so rapid is her flight, and appears as if a

bit of the surroundings had suddenly taken wings and tail, so nicely does her color simulate the rocks, dead leaves and trunks of trees. Close by the foot of a chestnut-tree, and moulded between the roots, that curve and twist above the ground, is her nest, containing a good round dozen of drab-buff eggs. To all appearances it is the cradle of a sea-bright fowl, that, with wild instincts, had wandered from the barnyard and stolen her nest in the woods. How accurately placed are these dumb quiescent chicks within the cavity! No human hand could have packed them so nicely. They must be thus arranged that not a single egg may be left out in the cold while she is sitting.

I cannot resist the temptation of once more stealthily peeping in on her, while returning from an afternoon ramble. There she is at the consecrated spot, and sacrificing at her altar. She is as motionless as a "prepared specimen," and so snugly crouched within the nest that nothing but her head, a part of her breast, and her gray-banded tail, which is bolt upright against the tree-trunk, can be seen at the distance of a rod.

What are her thoughts as she sits there through the long days and nights? Is it possible that she sleeps amidst so many anxieties? How the sun

burns her, and the wet leaves, in rainy weather, drip, drip on her devoted back. Those horrid guns and that barking dog, how dreadfully they echo through the woods ! Perhaps that is a weasel nosing about there in the dark !

Among these dangers, there is something that tells her to keep those germs beneath her warm for eighteen days, before they will find a voice and take to themselves legs to run away.

Further on the alders have taken the places of chestnut, oak and evergreen. While wading through the tall meadow rue and rough tangled bed-straw, inhaling the nauseous odor of the carrion flower, which grows here abundantly, and brushing away the mosquitoes that rise up at every step, in sufficient numbers to draw out your last drop of blood, I have scared from her nest the black-billed cuckoo. She flies away to an alder, uttering a few guttural notes as an alarm, and then remains quiet, but watching me very closely from her covert. The nest is a rude affair, the outside being composed of quite large dead twigs with leaves intermingled. It is laid carelessly on the branches of a prostrate arrow-wood, and hidden by the tangled mass of weeds growing around it. Some little attention is paid to the upholstering of the shallow

cavity, by chinking the fissures and openings with willow down. On this hard bed are laid three eggs, elliptical in form, and very light blue, as if the sun had faded them out. Evidently the setting fever is already upon her, yet her full complement has not been laid. The habit of laying while incubating is peculiar to this bird, so that eggs and nestlings in various stages of development, in the same nest, are often seen.

Partly concealed by the thick shrubbery, not twenty feet away, the male anxiously watches, his red eye glistening in the light like a round bit of colored glass, while his long tail continually moves up and down, as if he was trying to maintain his balance on the twig. Occasionally he gives me a specimen of his ventriloquism; opening wide his beak, he vomits out his harsh notes, like the turkey gobbler.

It is a queer sound and, though not sharp, can be heard even clearer a half-mile away, than when you are quite near him.

How many of the birds build near wood-roads and cow-paths! Even those that are secluded and love the deep woods, prefer to locate their houses where man or beast occasionally passes by, as if there was some law or impulse that drew them

close to such places. Food may be more abundant, or they may feel a certain sense of security, for however discreet they may appear, when they see you, I imagine that half of this shyness may be assumed, and that they are inclined to your society, if you are not over-curious and too inquisitive. How often these creatures play "peep-o" with you behind a screen of leaves !

All birds seem to understand each other's alarm-notes, although they may belong to a different genus, and there is something that causes them to congregate from all quarters whenever it is sounded ; for birds, like the higher bipeds, are of an inquiring turn of mind, and the same motive prompts them, I believe, to gather at any unusual occurrence in their precincts, which collects a crowd at a fire, or any other excitement in the streets of a city.

At such times you realize the number and variety of birds that, a moment before, were hidden and silent all around you. Here a female oriole, startled by the close proximity of a meadow-mouse, that like herself has come down to the stream to drink, flies up scolding terribly at the spectacle, and instantly the other birds gather around to inquire the reason of this consternation.

The cedar-birds appear suddenly on the spot, silent but observing. The song-sparrow hops upon a twig, from his washing, preens his speckled breast, and curiously eyes his brilliant neighbor. The yellow warbler holds up her head from behind an alder-leaf and goes skulking through the thick foliage. The indigo-bird looks upon the scene from the lofty spray of yonder elm, and begins a song, when a puff of wind blows him off and cuts it short. The brown thresher, last to come, flies across the opening, flaunts his long tail as he alights on a low branch, and utters a few croaks. Then all is silent as before.

From the middle to the last of June most of the birds have hungry families to maintain. Excepting in the morning and evening chorus not much time is spent in singing, so busy are they in searching for the particular kind of food necessary for the sustenance and growth of their children. These soft, smooth, fat spanners that are now measuring the leaves and hanging by their webs everywhere among the trees, have come just at the right time. There are hundreds of different kinds and sizes from which to choose, so that all tastes and throats are suited. Though the naked species of caterpillars are considered a more dainty dish

and are eagerly sought after by the birds, they seem to be as abundant as the hairy crawlers, which, I believe, are generally avoided at this season. So Nature in her harmony and completeness has ordered that these geometrids and other tasteful kinds should be over-prolific, that her stores may be well supplied with this prepared bird-infant food.

At this time, when they have the care of a houseful of hungry nestlings, I frequently in my walks start from the ground, at unexpected moments, pairs of those curiously striped birds called the black-and-white creepers. Although they are not shy, they have so many little artifices and stratagems by which to deceive whenever you happen within the neighborhood of their nests, that the needle in the stack is almost as easy to find. The female, which is the bravest and most ready to face danger, as is the case with other species, I believe, showing the more ardent and devoted love, immediately begins her maneuvering by flying straight at my face, as if she would lance my eyes with her sharp beak and at once end the whole matter. But this practice is soon discontinued, and she lights on the ground not three feet away, chipping sharply and quivering her wings, or flies

to the nearest bush where she flutters among the leaves and climbs up the twigs like some huge black-and-white moth. How expressive of the severest anxiety and concern are all these movements, and what distress and solicitude is told in that single note! Yet the greater part of this ado is only fuss and feathers and consummate acting — acting so true to life and full of feeling that it often causes me while witnessing it, to move aside to see if I have not already crushed her roof. The drama, however, is soon played out, and the feathered tragedian flies off the stage and hides herself in the side scenes of the greenroom. Although the search is long and diligent, the nest is still a secret known only to the builders. The performance never appears twice in the same locality. If, however, you chance to be within a few rods of it the next day, the monodrame is again taken up and rehearsed with the same spirit and passion as before. Many of the ground-builders, and those that make their nests in low places, display remarkable skill and ingenuity in trying to deceive and lead you astray. The towhee bunting is very successful in doing this, and the golden crown possesses wonderful adroitness and cunning in hoodwinking intrusive visitors.

This barberry bush has character and a significance now that a belated yellow warbler has selected it for a building site, and is busily engaged in fashioning her exquisite cup-like nest in the midst of its thorny branches. From a human standpoint she seems to be a very improvident bird, for she has chosen a bush growing close to a foot-path, where scores of young marauders are daily passing, and it is reasonable to predict that their sharp eyes will soon discover it, and accomplish their mischievous work of plunder before the full complement of eggs is laid. I have often noticed a tendency in these birds to place their nests in exposed situations. They appear to have a kind of trustfulness in man which is truly pathetic when you consider how surely it will be betrayed by these barbarians. Oftentimes the female will choose a spot in the immediate vicinity of the last rifled nest and, without the least caution or forethought, proceed to turn out, in open sight, with the same neat workmanship, another delicate structure.

I have known a yellow warbler to build three successive nests all within an area of a dozen rods, before a favorable issue rewarded her efforts.

But this one that I watch this afternoon works

on as hopefully as though nothing wrong were to happen. The female alone is the builder; her mate occasionally appears on the scene, but it is only to show himself or perhaps bring to her a sweet morsel from his extensive larder whenever he thinks of the hard time his wife is having. She visits her half-finished home often, but does not remain long, performing with haste a series of pickings and pressings, using her wings much in forming the perfect curvature, and hugging with her chin and bill the outer edges against her rounded breast, that the cavity may be moulded to it. She searches diligently for material near at hand — small strips of barberry-bark, willow-down, and tufts from the cotton-grass. How many laborious explorations have been required to concentrate all these into the little bunch of gray nesting-stuff, and fashion it so accurately in the junction of the three branchlets!

Curious to know at what time she left her work for the day, and whether or not she rested on her nest at night, I continued to watch her long after sunset, but now her visits were few and far between. At last, just as a chapel bell at “early candle-light” began its summons to the evening prayer-meeting, she circled near me and flew into

a thick cedar, where probably her mate was waiting to praise her, and was seen no more. Then I approached reverently, and gazed with admiration on this work which the sweet spirit of maternity had prompted.

The retiring sun darkens these aisles, and the heavier air seems to hold the fragrance of the bush grasses and foliage nearer the earth. Picking my way through the viburnums, where I find three species, the sheepberry, *dentatum*, and withrod, all now in full bloom, I discover the cause of this scolding of two swamp sparrows flitting through the bushes at my approach. Ah! here is the little fellow, not two weeks from the egg, perched on a twig, not daring to move upon his uncertain legs or weaker wings. How stupidly he stares at everything around him; then drawing in his head and half-closing his eyes, bides his time of strength and song.

The purple finch has instituted a vesper service on yonder branch; a Maryland yellow-throat peers at me through the foliage, but is silent, and like a sexton seems to admonish me to move in reverence during the holy hour. Near at hand, in the trees, the robins were talking to one another like chickens going to roost. Softer bird-whisperings were

heard, not querulous, as they settled themselves on the cedars, and bade each other good-night. The wood-thrush is the songster, the *rara avis* chorister in this temple. It is not until evening that his throat is properly cleared for the performance; the bird seems to be inspired by his own hymn; it is expressive of delicate and refined thought, and awakens the poetic and spiritual sentiment in the mind of the listener.

The deepening shadows bring out the ghostly night-moths winging abroad to be preyed upon by the whip-poor-wills.

Standing in the road, and looking back in the lingering twilight upon the dark mass lifting itself beyond the nearer fields, I would that some power other than imagination be given me, to see distinctly the situation of each little songster, now silent and at rest, in there among the leaves.

WINGED ROBBERS AND NEST-
BUILDERS.

V.

WINGED ROBBERS AND NEST-BUILDERS.

THE birds of prey, or Robbers, as they are called, possess many characteristics analogous to those carnivorous quadrupeds the cats ; the upper mandible always curved in this order, forming a sharp, strong hook for the purpose of tearing the flesh of their victims, and the generally retractile talons, by which to seize their quarry, comparing with the teeth and claws of the leopards and panthers.

Their mode of attack also resembles that of the *Felidæ* in many respects ; likened to their velvet paws are the soft pliant wings of hawks and owls, so that while flying they may draw near their nimble prey without being heard. Their strength, quickness and grace of motion, and even their strange screaming voices, are all suggestive of the tigers and ocelots ; as if Nature had armed these rapacious creatures to destroy all animals less fortunate than themselves in weapons of self-defence.

As this class of birds do not take much pains in dressing their food at the time of eating, but swallow feathers, hair, bones and all, Nature has provided a skillful contrivance within the muscular stomach, which separates the indigestible parts, and rolls them up into wads or pellets, to be thrown up after the disuniting process has been completed.

Notwithstanding the weakness these robbers have for a tender chicken now and then, they render good service to the agriculturist as his "man at arms," by ridding the meadows of mice and other vermin, which, but for them and the house cat that takes occasional strolls, would soon swarm the field, destroying the grass roots and girdling the apple-trees. As a proof of their usefulness to the farmer, a curious naturalist examined a certain number of these pellets and found them to be the remains of mice, moles and insects with a very small proportion of those of birds.

We often come upon specimens of these aërial highwaymen, descended to earth, perched on some fence or stump, where they remain apparently unconscious of surrounding dangers, and stupid from excessive feeding. My correspondent, Mr. W. B. Allen, a close observer of the birds, has

given me in a letter from Maine, such a graphic description of a marsh hawk while in this gorged condition, that I cannot resist the impulse of quoting from it. He says :—

“ I soon caught sight of my marsh hawk perched on a broken birch about five feet from the ground. I have no doubt his nest was near, but the bog was so flooded by the rains that I gave up the attempt to reach it. Meanwhile the bird sat hunched up in true falcon fashion, looking stupidly from side to side, occasionally uttering his cry, which resembles the magnified twitter of a sparrow. He was evidently disgusted with the rain and wind which now and then blew his feathers the wrong way, and made him look extremely foolish. As I advanced he shrugged his shoulders like a Frenchman crying *Oui, oui, oui*, and ruffled up his draggled plumage with such a disconsolate expression, and with apparent unwillingness to leave his post, that I took pity on him and disturbed him no further.”

One of the smallest and most common of our falcons is the sparrow hawk (*Falco Sparverius*) ; a bird of strong peculiarities, sleek, trim, and a winner in life’s race. Although in the breeding season, and in the midst of household cares, he generally preys on the grasshoppers, crickets and

other insects, he loves to vary his diet occasionally with a small chicken pie in payment for his services, or to rob the fields of a cheerful song by dealing a death-blow to some unsuspecting sparrow that is winging its way across the meadows.

No other bird causes such commotion in the poultry-yard or in the household as he. Every one knows his skulking propensities; how with noiseless wings he lurks here and there among out-buildings and orchard trees, ready to pounce on some industrious brood. His coming like a thief is the event of the day on the quiet farm. He is such an airy sprite that no one has seen him but the cowardly hens that suddenly leave their scratching and with outstretched heads run for the nearest covert, while the lordly rooster follows more slowly, sounds his alarm note, and assumes an heroic air, as though he was not afraid of all the hawks in the world. Meanwhile the poor, bustling mother-hen, with her downy responsibilities, spreads out her wings, ruffles all the feathers on her body, and tries to look as large and as ferocious as possible. But it is a vain show! What can she do with that brisk, lithe, clean-cut plunderer above her? Before she has, in her agitation, half-turned round, those long, narrow wings have carried down

the fatal claws which close into the tender flesh of the plumpest chick in the flock and bear it off triumphantly.

By this time the news has been communicated to the family at dinner (for our freebooter seems to choose such occasions to perpetrate his crimes) and there is a general uprising from the table, and a rush to the windows and doors, but before Ben can have a chance with his gun to end the life of the insidious marauder, he has vanished like an apparition into the neighboring thicket, to feast at leisure on the game that perchance a short time before, in its turn, had seized a helpless angle worm. Thus it is in Nature: "She arms and equips an animal to find its place and living in the world, and arms and equips another animal to destroy it."

But there is one little bird in the orchard that does not appear to be afraid of our winged pirate. The kingbird, if not a *raptor*, is at least a tyrant, a petty tyrant, a veritable monitor of the air, that plagues the life of the larger birds. What a fierce eye he has, set in a head-dress so ruffled and carelessly worn! He has an irritable temper, too, and the least interference with him sets his head on fire at once. Either for some real or fancied

wrong, he pursues his foe with wrathful frenzy and persistency, flying above and darting down on his enemy with such fury that the hawk is glad to flee with all possible haste from the well-defended precinct.

Another well-dressed robber of the woods and orchards is the blue jay. He loves at times to scream like the hawk. To the human ear, the imitation is very close, but the hawks discriminate more nicely, and know that it is not genuine. Two families of the same trade can never agree. The falcon does not like to be widely advertised, or to sail under false colors, and so very often the dandy hypocrite pays dearly for his dissemblance. This small blue crow, however, is a talented bird, with a flexible trachea, and can upon occasion resort to other notes almost as sweet as those of thrushes. Willie, Willie, he says very plaintively, *vee-e-e-la, vlee-ee-vlee-ee*, as though he were playing on a flute. He has withal a Pecksniffian appearance, an air of injured innocence, as if it were uncharitable to impute to him the crime of breaking up a score of homes in as many days. And so this morning he flashes through the woods, and, standing on a bough, attempts to lecture the birds in his soft persuasive voice which indeed

would be very effective to his listeners did they not know what a consummate knave he is.

During the recital of these sweet sounds no one with an eye to the charms of graceful movement would gaze upon him, for in his most pathetic parts he performs such painful, awkward, clownish contortions as to detract at once from the pleasure received through the sense of hearing and leads you to the belief that all he utters is mere cant.

The robins and cat-birds know him "to the very heart of loss," and take every opportunity to break in upon his sweet beguiling discourse with beak and claw. Sometimes a dozen male red-breasts will organize a raiding party to hustle him from his rostrum, diving at him furiously and plying with their bills such heavy strokes that he is forced to fly down and out, shamefully seeking some safer covert, and never resenting the abuse that is put upon him.

If one loves to watch a bird of graceful flight, he should betake him to the mouth of some large salt-water river, or to the ocean's shore where the sea-gulls float to and fro over the waves, or drift like foam before the wind. Here, too, he will surely find that magnificent falcon of the seas, the

American osprey. He has a proud, stately bearing as he prowls far above the waves in airy circles, and sails with easy sweep of his powerful wings against the wind, ready to fall on some surface-loving fish. A distant view of one, seen through a glass, has the appearance of a large horizontal bracket against the gray clouds.

I have often thought this bird loved the sport of fishing. He never appears to be in a hurry or impatient, but plies his trade in quiet contemplation. The complete angler is he who knows his favorite species, and the best wind and weather in which they can be caught. At times he makes a sudden plunge down through the air, but on coming near the surface of the water rises up again and resumes his sailing, as if he delighted to see his game scamper away from his sharp hooks. When he has caught a fish to his taste he immediately proceeds to the shore, flying slowly and laboriously along, like some large heavily-laden craft, with his quarry held lengthwise or parallel to his body, so that it may present the least resistance to the air, and no more impediment to flight than is necessary.

Who, by studying the philosophy of sailing, has had the problem fully explained? It is a note-

worthy and curious fact that insects, gnats, dragonflies, moths, etc., have larger wings, in proportion to their size and weight, than the sailing birds, such as the ospreys, eagles and albatrosses. None of the smaller birds can long sustain themselves in the air without the beating of their pinions; but these heavy weights can scale and soar for hours without any apparent movement of the wing, in some mysterious way which they have not seen fit to divulge to man.

The example of the flying kite has often been quoted; namely, "the string and hand are to the kite what the weight of the bird is to the inclined plane of the wing," but no one has ever beheld that interesting toy perform such wonderful aërial tricks as these remarkable kings of the air.

The osprey, or fish-hawk as he is often called in New England, is the only species in the genus *Pandion*. The male is larger than the female. This is an exception to the majority of cases in the hawk tribe. In some species the difference in the measurement of the sexes is very great; the husband being three or four sizes smaller than the wife, and by no means as attractive in plumage.

There is a large, white muffled robber, a native of the Arctic regions, who in winter makes incur-

sions into many towns in New England, and his advent is sure to be the subject of conversation for nine days at least, at the corner grocery and among the young hunters of the village. "Bob," without a gun of course, had seen one down in the pines, and "Nat," cutting across the "Nicky lot," had scared one from a scraggy apple-tree, that glided away as silently as a ghost, and was soon lost in the snowy landscape. A lot of large feathers scattered under the turkey roost next morning, and a missing fowl, told too plainly that the spectre in the form of the snowy owl had appeared in the moonlight night and carried off the flower of the flock.

For this crime and also for the love of hunting, no peace is given to Snowy who, innocently enough, reared as he is in the North where birds are not domesticated, considers all game as legitimate. Before the season ends, the boys have succeeded in trapping him, or in obtaining his skin, which when stuffed is placed in their museum or on the mantel as a proof of their skill and valor.

If he is as well mounted as Mr. Field's white owl, he is certainly a curiosity. His large yellow eyes in front, firmly fixed in their sockets so that they can be turned in any direction only as the

head is moved, staring out from the mass of head feathers, give him the air of being very wise. The long, thick, loral hairs completely hiding the bill, and reaching on each side along the cheeks, like a heavy mustache, the thick body feathers and the pure, snow-white plumage of the legs and toes, like good, thick stockings, testify how thoughtful Nature has been in wrapping him up to withstand the Arctic's cold.

One of the most cruel of our feathered cut-throats is the butcher-bird (*Lanius borealis*). Ornithologists have placed him as the connecting link between the sweet-voiced vipers and the seed-eating finches, but by some strange perversion he has taken to the road as a highwayman and murderer, and all the bird-preaching in the world will not correct his strongly-confirmed bad habits.

He breeds northward. In winter he journeys to Middle and Southern New England, where game is more abundant, and is seen lurking about fields and orchards, and even in the cities, to prey on those feathered metropolitans, the English sparrows. At times he lights on the telegraph wires and the topmost twigs of the highest trees, as if he was amusing himself by trying to know how well he could keep his balance on such uncertain

perches. His flight, like that of the hawks and owls, is gliding and noiseless, but unlike those robbers he lacks the strong talons, and depends on his powerful beak to commit his murders.

One afternoon a few winters ago, at Hillside, we saw from the window one of the most pitiless bird tragedies of the season.

"Oh! do come here and see these two little birds playing in the snow," said one who was always watching for rare, unusual things in Nature, even for four and five-leaved clover. "Aren't they playing?"

There in the front yard, under our very eyes, a bold butcher in ashen coat and black mask, had flown down and was chasing an English sparrow round the elm trunk and through the lilac bushes. The fun, however, appeared to be all on the side of the larger bird, who evidently before our coming had wounded the wing joint of poor finchy. The latter made several vain, painful attempts at flight, skulked between the fence slats, hopped for dear life to the stone wall and crouched beneath the lower rocks. But the endeavor to escape proved ineffectual. The ruthless murderer always on its track held that stout, sharp black knife over his quivering victim, and when at last he had sat-

isfied his cat-like love of torturing his helpless prey for torture's sake, he gave it the fatal blow, seized it in his strong gape and bore it away to his shambles.

It is interesting also to consider the breeding habits of the different birds, the various styles of their houses and the crafts and trades that Nature has taught the many species. The little auks, the stormy petrels, kingfishers and bank swallows are miners. The nut-hatches, woodpeckers, and many of the titmice, with their sharp chisels, hammer away on some decayed trunk in the woods for days together, till their log cabin is finished. With few exceptions the swallows are masons and plasterers, and fix their adobe houses in the most dexterous manner on projecting cliffs and eaves of barns. The vireos and orioles are bag and basket makers. The grebes and water-hens are raft-builders and moor their floating homes to some strong-rooted aquatic plant. There are also tailors, and weavers, and platform-makers among these feathered architects. A few of the birds, however, such as the foolish guillemots, night-hawks, and some of the wise owls, have lived from generation to generation without learning the art of nest-building.

Wherever a rock is found that simulates the

color of their eggs, or any cavity, either natural or artificial that offers itself, these winged tramps appropriate it, and then, without any upholstering or fixing up they deposit their eggs and rear their young. On the other hand, how many of the birds are not skilled workmen, but are true artists! That the sense of the beautiful in them is well-developed is evident from the fact that many species ornament the exterior of the nest with wreaths and rosettes of moss and lichen. The well-known habit of the bower-bird of Australia, that collects objects of brilliant color, such as shells, feathers, etc., arranging and re-arranging them before the entrance of its bazaar bower, is a remarkable instance of the real æsthetic taste of birds. The humming-bird, too, is a gay little artist, and no wonder, with its slender needle bill and deft wings which enables it to rest on the air, or dart like an electric spark here and there around its tiny hermitage, tricking it up with bright bits of moss and fern, plant-down and lichen, and making it a perfect type of bird architecture. It would be entrancing to behold such a spectacle.

There are three or four of the characteristic builders that I wish more particularly to describe to you, the first being the bank swallow or sand

martin (*Cotile riparia*): "a twitterer or prattler by the banks of streams." As has been already stated, the swallows, with a few exceptions, are masons and cementers, but here is a little artisan that has taken to the ways of the miners, and digs a tunnel sometimes of an extraordinary length, in the sand banks, at the end of which it forms an oven-like apartment for the eggs. What has caused this species to depart from the usual swallow-method of nest building?

Ages ago, under peculiar circumstances, it is probable that the bird discovered that picking was better for it than plastering; so here it is at the present time with trade well learned. How hard it works! It seems impossible that such a short, small beak and slender claws could perforate the solid, sandy bluffs at such remarkable depths as these birds have been known to reach. There are recorded tunnels nine feet long, although the usual length is not much over two feet. The reason of this great difference in the length of burrows made by the same species is, that whenever they dig in pebbly embankments they often in the passage come upon small stones; these, the sagacious miner considers, should it locate its nest near them, would prove disastrous if by accident they should fall on

the eggs or young ; so it continues its work, until it finds a place free from impending danger. Often-times, however, after having dug a short distance and met with obstructions, it abandons the work, and commences in a new place. I have seen many such beginnings along the banks of the Piscataqua River in the vicinity of Fox Point, N. H., where large numbers of this species make their homes.

In preparing for a fresh start it clings perpendicularly to the cliff and buries its long claws in the sand, as if to secure a suitable fulcrum ; then with its short brad-awl-like beak goes to work with a will. The whole body seems to be in violent agitation and moves slowly, like an eccentric in an engine, as it rapidly picks from the centre outward. Both the male and the female, I believe, are engaged in this work, as is usually the case with those birds that take extra pains in preparing a nesting-place. In a week, or perhaps more if the sand is hard and the tunnel is long, the mining is completed and the pair proceed to upholster the nest cavity with hay and feathers, ready for the five pure white eggs and the young miners which, if their house is dark and moist, are made comfortable and warm by the bountiful supply of insect food brought to them by their parents.

There is a little titmouse (*Psaltriparus minimus*) that plays on its lute in the woods along the Pacific coast, and may well be classed among the Refined Builders. It is a skillful artist, and its nest-making habits are quite different from those of its relatives who inhabit the woods and orchards of the Eastern States. It employs its beak as a shuttle rather than a chisel. The house is very large for the size of the bird, and in general outline resembles a sack eight or nine inches in length and three in diameter, suspended from the fork of some lower branch. The exterior is ornamented with tinsel spangles of moss and lichens nicely interwoven with fibrous roots. The cavity, six inches long and half an inch wide, is softly and thickly quilted with willow down and feathers, a fitting receptacle for the delicate, pearly shells that imprison the embryo minstrels.

The titmice are prolific layers, and this species, the smallest of the family, is not an exception to the rule; oftentimes as many as nine eggs are found in one of these decorated bags. Like all members of this group they are social, convivial little bodies, and, as if trusting in man and other oölogists, appear to take no pains in concealing their large and conspicuous nests.

In striking contrast to the Refined Builders are the savage architects or Platform Makers. The falcons, hawks and eagles are of this class, and the golden eagle may be considered the master mechanic among the tribe. What a ferocious burglar is this robber in the mountains ! So completely armed is it with falcons and hooks, that when it essays the tender occupation of home-building, its murderous weapons seem to be out of place, and so, at the best, it makes of it an awkward piece of work. High up on the projecting shelf of some rocky crag its nest is placed. Both the male and female are engaged in carrying the material for the foundation. This is composed of sticks, usually quite long and oftentimes more than an inch in diameter. As is the habit of all the tribe, it takes the timber in the talons, never in the beak, and holding it lengthwise with the body, that it may not impede the flight more than possible, bears it aloft. Hovering over the eyrie it drops its load. Little attention is paid to adornment. Mass and thickness to withstand the wind storm and to protect the eggs and eaglets from the chill and dampness of the rocks are the only points to be looked after. This plain heap of sticks made level on the top, and covered with soft lining, the king

of birds is content to call his home, and here in its lofty stronghold, year after year, if undisturbed, it returns, and with more or less repairing of the old house, rears again its young.

The eggs have very thick shells and are usually three, though sometimes not more than two are laid. They are dull white, and many specimens are blotched with brown. In the breeding season these robbers are noisy, as if protesting against the home restraint. What a wild, savage scream is that sent forth from its carnivorous throat! "like a prolonged blast or whistling of the wind through a crevice in the sky." It is the counterpart of the howl of the wolf or the screech of the panther; a voice that suggests excessive pain and tearing of flesh. I imagine at such times the hare leaps swiftly to its covert and the doe becomes anxious for the safety of her young and tender fawn.

All of the grebes have interesting habits. Although they are great water lovers and very skillful swimmers and divers, they do not have webbed feet like the ducks, gulls, petrels, and many other water fowl. The toes are connected only at the base, but are widely margined on the inner side with tough skin, rounded and broader at the nail-like claws, each resembling an oar blade.

Their summer resorts are in the high northern latitudes. In their migrations a few of them remain within the limits of the United States, but the majority pass further on — to the Hudson Bay country and the Arctic Ocean coast, where they frequent the shallow borders of lakes, rivers and deluged marshes, among the reeds and sedges, to build their nests. The mother grebe is very awkward on the land. It is impossible for her to walk gracefully. She moves by jerks, as if she was fettered. Her legs are situated so far behind that she can keep her balance only by sitting upright, like the auks and penguins. As it is difficult for her to move around readily on the land she takes to the water, where she is perfectly free to build her floating raft. This is composed of reeds, rushes and other aquatic plants, thickly matted together and slightly raised above the surface of the water. After the boat is finished and well anchored to prevent it from being carried away by the winds or currents, the builder makes a shallow cavity on the top and lays four light green eggs. During the season of incubation, which lasts a month, she is tossed about on the wavelets, keeping a sharp lookout for minks, otters, and other furry fishers and egg-eaters that abound in these

creeks and lakes. Indeed it is an anxious time to her, amidst so many enemies, and she is forced to resort to artful dodges to evade them. When alarmed by an intruder she quickly covers the eggs by material constantly at hand, and then quietly slides overboard, and sinks so gradually that not the least stirring of the water is visible. This is her usual habit, although she has a quicker method of concealing herself when occasion requires it. She is capable of remaining under water more than five minutes, during which time she has paddled along the lake or river bottom out of danger, and then she rises cautiously, allowing only her nostrils and eyes to be raised above the surface while taking breath and observations. In due time, if no accident has occurred, the pretty little downy young are toddling about on deck, uttering faint peeps, not unlike ducklings, and stretching out their curiously speckled and striped heads and necks, as if to inquire the meaning of the sudden light. The floating home, by being in the water so long, has become leaky and uncomfortable, so the mother takes her children on her back that they may bask in the sunlight and be strengthened. They must be fed also, so before diving she carefully tucks them under her wings, placing

them in such a way that their heads are toward her tail and resting on her body. "Hold your breaths!" she says in gentle grebe baby-talk, and away they go to the bottom. Here she skurries after the darting minnows, or stops to gobble up some delicious insect larva, or feeds on the juicy water plants and algæ growing abundantly on these submerged grounds. What a strange ride, and how long the grebe chicks remain beneath the water! Evidently their breathing organs are so formed by Nature that the usual necessity of frequent respiration is not required.

After two or three weeks schooling in the art of diving and feeding, the young are left to shift for themselves, and the parent bird day by day becomes less attentive, until finally she casts off the tufts of bright feathers on her neck, and all household responsibilities, till the next year.

Far out to sea, in the southern latitudes of the Indian Ocean, more than a thousand miles from the continent of Africa or Australia, lies an uninhabited island named Desolation or Kerguelen. Ships passing on their way from Europe or the United States to Melbourne sail quite near this lonely land and sometimes enter Christmas Harbor, at the northern end, for fresh supplies of

water. Here, if the sailors visit it at any time between the months of October and January, they will see vast numbers of the wandering albatross describing graceful curves high in air, or sweeping down on the table-land where their curious nests are placed.

The albatross, if it is a great wanderer, is also a lover of home and has an excellent memory, for after five months' voyaging over many leagues of the dreary ocean's waste it always returns at the end of that time to the land of its birth, and occupies year after year the same abode.

It is an odd nest that this remarkable bird makes. It is in the shape of a half-cone, and this is the manner in which it is constructed: after a heavy fall of rain has softened the earth, both the male and the female go to work with a will, digging with their strong bills a circular ditch six feet round, pushing up the mud, mingled with grass, nearer and nearer the centre of the circle, pounding and shaping the mass with their spades into a solid mound two feet high; at the top is a shallow cavity in which the mother albatross lays only one white egg.

And now begins a long, tedious season of incubation. More than two months is required to

hatch out the young, which at first appears a moving white ball of the finest silky down. It grows slowly, remaining in the nest for many weeks, carefully watched and fed by the parents, who take turns in going to sea to capture small tender squids and jelly-fish for the helpless squab. At last, as if urged by some mysterious force, the father and mother suddenly desert their child, and wander for many months over the "trackless ocean," far out of sight of land, but never, except by accident, visiting the Northern Pacific or Atlantic, where other species of this genus are found. It does not like to fly by night. It is a beautiful spectacle to see it stooping with extended wings from the cloudless sky, and touching the waves with almost the lightness of a feather, as it settles down amongst the patches of floating seaweed or in the wake of ships, to feed upon mollusks and shell-fish, or the offal thrown out by the sailors.

What keeps the baby albatross from starving during the long absence of its parents is a question that has never been answered. For a long time it is not able to fly, and therefore cannot obtain its food in the usual manner of older birds. It is possible that it derives its sustenance from the surplus fat stored in its body during the first two

months of excessive feeding, or rambles over the table-land in search of whatever it yields of worms and snails. It is certain that it manages in some way to thrive, for when found "it is lively and in good condition."

When the old birds again return from their long voyage, the young albatross, that appears to remember its parents, immediately proceeds to caress them by pecking with its hard hooked bill their heads until that portion between the beak and the eyes is bare of feathers, sore and bloody. This rough kind of fondling is endured for a short time, as if they wished to make amends for their negligence, and then the youth is harshly turned away, while these old mariners at once begin to repair the same nest for another season of housekeeping. When they again set sail, the child of the previous year, that has now attained sufficient strength of wing, accompanies them, to be in turn taught the mysteries of the sea; and after a long and stormy voyage over unknown waters and strange coasts it will return to this island of Desolation, there to choose a mate and rear a little one to take its part in the restless life which the albatross seems to love so well.

WONDERS OF POND LIFE.

VI.

WONDERS OF POND LIFE.

THE microscope is a wonderful instrument. Few purchases will afford so much enjoyment, for after you have learned to use it, it will bring to light thousands of curious minute living animals and plants which, in your oddest dreams, you never thought of.

One who looks through it into a drop of water thickly populated, looks into another world, as it were ; for under the objective appear some of the lowest forms of life, from mere masses of gelatine, moving along upon the glass slide, which may belong either to the animal or vegetable kingdom, up to the tiny specimens of *Crustacea*, the water fleas.

Let's go to the pond, down by the willows, this beautiful morning. It is as good a place as any to obtain the tiny wonders, although life is everywhere : in the air, on the earth, flying and crawling ; even the mould on this stick, which we pick

up on our way, is a collection of living plants that bear fruit; where creatures, perhaps, are crawling among the branches — creatures so small as to be invisible to the naked eye, but which the microscope would reveal.

In place of hooks, lines and baskets we bring two or three wide-mouthed vials and a good dip-net, for we are after smaller curiosities than bream and perch, which seem to be having a kind of dumb carousal in their little world as we approach the shore.

Do you notice this green scum on the surface, around the edge of the pond? Yes, you have seen it a hundred times before. It looks like litter and the commonest filth, does it not? Yet, believe me, this rubbish, as you might call it, is composed of fresh growing plants floating or rolling about in the still or slowly-running water, and getting their nourishment from it, as other plants get their food from the earth. These kinds of plants belong to a family called *Algæ*, which really means seaweed, and is so named because so many species grow in the ocean; but those we see in ponds and streams are so very small that the microscope is needed to tell us how curiously they are put together.

Let us now fill our vials with this “green stuff,”

making sweeps with our nets as we walk around the shores, gathering in not only plants, but green forms of animal life, and hasten home to inspect our booty. To enjoy a few of the interesting things that we see in our walk, each one should be provided with a microscope.

Hold up a vial to the light and look at those little green balls, scarcely a thirtieth of an inch in diameter, rolling round and round in the water, like mimic worlds in space. Let us catch one or two of them with your dipping tube, and place them carefully in a single drop on the glass slide or "live box." Now look down through the instrument, and see how large it has suddenly grown. This is *Volvox globator* (rolling ball). It looks now like a crystal ball, covered over with a delicate network. At the corners of the meshes are seen bright green specks, like small shining emerald beads. We will screw on to the end of the tube another object-glass, which seems to make this revolving globe still larger, and find that these green specks are not specks at all, but little club-shaped bodies, each having two very fine hairs or cilia, as they are called, attached to them, which are continually moving, and which serve as paddles to propel the globe through the water.

These green bodies, of which the Volvox is composed, are incorrectly called *Zoospores*, from *Zoon*, an animal, and *Sporos*, a seed, and have the power of moving round so lively from place to place, that at first it seems impossible to believe that they are not animals ; but after a great deal of talk among learned persons it has been at last decided that these curious objects are plants, and belong to that great family (*Algæ*) of which we have spoken.

How do these plants grow ? At certain times each one of these Zoospores, or moving seeds, have buds growing from them, or are divided into two parts, and each of these two parts becomes in its turn the parent of other cells which change into moving seeds, and, being very social little bodies, gather themselves in little round balls within the larger globe. There are nine of these small green spheres in the one we see, which, if nothing had happened to them, would finally have burst through the walls of the mother plant, and started off on their rolling excursions to rear in turn other families. Both the parent plant and her children have openings or pores through which the water flows, giving them the food and air they need. These we cannot see because our instrument is not of sufficient power.

But we will not speak to-day of other interesting kinds that might be seen in this curious Algæ family, for there are a few odd specimens in animal life in this museum, to which we must allude. A drop that clings to this speck of half-decayed vegetation, taken from a bottle, must surely be rich in animalcules. The live-box is a necessary implement to spread the drop over the slide at a uniform thickness. A power of two hundred diameters is quite sufficient for our present purpose. Now let us place it in position, draw the curtain aside and look in. Here is the *Amœba*, "named in honor of a fabled god who could be either animal, vegetable or mineral in his nature," that looks as if a small portion of the white of an egg had been placed on the glass, and some magician had given it the power of locomotion. Such bodies as these must have stretched themselves along under the waters in the beginning of things. It is continually changing its shape. Now rolling itself up in a ball, now pushing out fingers here and there, so that the whole mass is sinuated in every possible design. There is something remarkable, too, in the manner in which it obtains its food. It feels along with its fingers until, for instance, a diatom is reached, when it gradually surrounds it, and

appropriates its substance. Why does it reject one object and accept another for its living? Can such a gross lump of jelly think?

In another part of the field appears a creature, perhaps a notch higher in the scale, called the *Rhizopod* (root-foot), which looks at first as if a number of small white worms had tied their heads together, and carried about with them a regular hexagonal shell. It is very slow in its movements, and the load seems to be heavy. These sarcode feet, extended in all directions, inclose small black granules which move in certain courses, and are considered to be similar to the grains of sap which circulate in the cells of plants.

Attached to this decayed stalk just above the rhizopod is a curious inhabitant of the drop, named the *vorticella*, or bell animalcule — tied to an india rubber string! How greedily it feeds! Situated at the rim of the bell are small hairs, or cilia, which seem to be revolving rapidly, making a current on which is carried to its mouth smaller infusoria, or whatever may be suitable for food. Think of such a creature becoming alarmed! I tap my finger on the stage, when instantly, quicker than our eyes can follow, the animal is jerked back by the strongly contractile cord, the cilia are

motionless and the big mouth closed. Immediately after the elastic string begins slowly to uncoil, but not until it is straightened to its full length does the wide mouth open as before.

Just now I am quite sure a vorticella shot across the field, minus its flexible stalk. Let me move the slide to bring it into view. Yes, here it is ; evidently a young one has lately broken away from the parent stem, and is casting about to fix for itself a local habitation. While it is prospecting, an opportunity is offered to examine the creature at this stage of its inexperience. It is now provided with a second fringe of small hairs at the base of the bell, so that it may be propelled through its little world of troubled waters. It was your bad fortune, O, Vorticella, to wander near when this drop was confined. Alas ! it will soon evaporate, and leave you a dust mote, to be blown hither and thither until some favorable breeze shall at last restore you to your native ditch.

Here is an interesting little worm-like creature, named the *Rotifer* or wheel animalcule, crawling along after the style of the spanners or leeches. Now it fastens its tail on the glass, by means of two sucking disks, and lengthening itself out like a spy-glass begins to feed. Two wheels, con-

cealed until now, are suddenly thrust forward, and seem to revolve as steadily and rapidly as a pulley on the shaft. These two circles of whirling cilia are placed one on each side of the mouth, and move in opposite directions, disturbing the water for some distance in front of the animal, and drawing toward it a raft of small diatoms, which it crushes with a mouth that opens and shuts with the regularity of a heart-beat.

The rotifer is comparatively a highly-organized inhabitant of this museum, and its perfect transparency enables one to see the internal structure, such as the alimentary canal, eggs, and the process of digestion. It has eyes, too, though I am forced to believe its vision cannot be very extended, and even with this lens I am unable to discover any gleam of intelligence.

Drawing the slide a sixteenth of an inch to the left brings us to another region as yet unexplored. Ah ! here is a form stretching its long neck clear across the field, and apparently pecking amongst the spiral vessels which the partly decomposed vegetable reveals. Now it draws in its head, arches its neck and continues to make quick but feeble thrusts at a passing throng of monads. The likeness is so striking that it has been named the

swan animalcule. In a favorable light one can see the cilia moving on parts of its body, which may be compared to feathers, thus adding still more to the general resemblance.

What is this transparent bag of cells gliding over the glass? It has a long lash in front, and seems to be earnestly seeking for something which, so far as one can see, it never finds. At last, as if angry with its ill luck, it fastens its cilium to the glass, lifts its body and begins to whirl around in a most fantastic manner. Exhausted with its efforts (if such a thing can be weary), it remains motionless for some time and then resumes its endless search. May not this be the larval condition of some higher infusorial life?

No vertebrates appear as living microscopical objects, such as very small fish, swimming around in the live-box. With the exception of a few water-mites, the only representatives of the larger, higher animals which are comparatively nearer the reptiles, are the water fleas, so called, no doubt, from the fact that many of the species move through the water with a jerky motion, and bear some resemblance to the insects.

The most common species in the order *Entomostacea* (insect shelled), and one which can be found

in every ditch, is the *Cyclops quadricornis*. What a long, hard name for such a small creature ! It is certainly two hundred times longer than the animal when seen with the unassisted eye, and means the one-eyed water-flea with four horns. These horns or feelers, you see, are all placed up near the head, and are used while swimming, as well as to touch things, as you do with your fingers. It has a single bright red eye in the middle of the head, and at the base of the pear-shaped body, near the forked tail, are two egg sacks (for this is a mother Cyclops) filled with eggs, which she carries with her until they are hatched. The young do not look like their mother. They have no tail; only joint segments at first; and the feelers are placed on the side of their square little bodies as legs.

As to Cypris, looking like a tiny clam hardly larger than a pin's head speeding through the water until you have magnified it, and Daphnia, the branched, horned water-flea, throwing up its arms as if astonished at the situation in which it is so suddenly placed, these are both near relatives to Mrs. Cyclops. Although moving with a quick, jerky motion, they are not insects, as their common names would imply, but belong to the same class of animals as the shrimps, lobsters and crabs.

As the astronomer, pointing to the heavens an inferior telescope, can with some satisfaction view many of the planets in the solar system, yet when he desires to reach further finds it insufficient, so with this objective we only receive hints of what is beyond, and wonder at the infinitude of the minute things in Nature.

Beside these minute forms of life, that can only be studied with the aid of the microscope, there are many larger curiosities, which if confined in an aquarium, and watched through a simple magnifier, will afford one many hours of delightful entertainment.

The crew of that wonderful sub-marine ship of Jules Verne's imagination never encountered more surprising creatures than one can collect in a day's search in any pond or stream within a radius of ten miles of the metropolis. The gigantic mollusk seen by Nemo at the bottom of the ocean would be less amazing to me than the larvæ of the May-fly, the common caddis-worm, which have the curious instinct of building for themselves millions of homes for the protection of their dainty bodies against the crafty and greedy fish. There are several species, two of which we will at once put under our glass. They are work-

ing amid a thousand perils ; here a playful shiner swims up noiselessly to nibble, but the stone mason suddenly quits his labor and goes in. The danger being over, it cautiously shows its head again and resumes the occupation of clutching with its mandibles and feet small grains of sand, actually turning each grain over and over, as the workman in building a stone wall will turn a rock in his hands to decide its best fitting-place. Then with water-proof cement (saliva) it places grain after grain around the end of the case until it is completed. In this little round stone house it crawls along on the bottom of the tank, comparatively safe, proving too much even for a fish's curiosity, but at the expense of a very heavy burden, and, when in its native stream, eking out a most precarious existence of two years.

The other species under our observation is quite small and not so clumsy. Its house is made of short, narrow strips of grass, pasted together by the animal, and arranged in regular spirals. From it appear the head and two pairs of legs, by which it propels itself through the water, always maintaining a perpendicular position, and waltzing up to the surface in a most comical manner. We will rob this fellow of his home. The creature offers

some resistance, of course, but by careful maneuvering the burglary is committed without taking life. The interior is richly upholstered with fine spun silk, which no doubt secures the animal within the case, and prevents its tender body from rubbing too hard against the coarse material of which it is composed. On each side of the body are six pairs of leaf-like gills, connecting with air tubes by which this most interesting larva breathes. After viewing its forlorn condition, we thrust it on the cold mercies of the aquarium, wherein it immediately sets about prospecting for another house.

What curious insects are these water-boatmen ! Look up through the water at them. A few playful but masterly exhibitions of their skill, and they arrive opposite the judge's stand, lying on their backs. How much their wing-covers resemble a miniature canoe, water-tight, and shining like burnished silver ! Evidently they are preparing for the start ; see, one of them is cleaning its paddles and brushing its keel, as

— “ wet flies twist their thighs
When they wipe their heads and eyes.”

Look on deck with the magnifier !

Their hind legs, which they move to propel their boat-like bodies through the water, precisely as a single rower propels a boat, are very long and made broad, like oar-blades, by the thick, long hairs.

What finely constructed row-locks ! Old as the world, and never patented ! There they go. How nicely they feather their oars — why, Hanlon never dreamed of such a stroke.

Here is a white leech, measuring its slow length along the side of the tank. Has any naturalist noticed this species ? What wonderful maternal forbearance and affection ! Fourteen little young leeches, all very much attached (literally) to their loving mother.

Twisted around the stem of a water-cress is the *Gordiuz aquaticus*, or hair-worm. This specimen is one foot long, and no larger than a common hair of a horse's mane or tail. It is continually in motion ; now tying itself into a complicated knot, now straightening itself out to its full length. The general belief that they are transformed horse-hairs is incorrect. The history of their development from the egg is most interesting. After hatching, the larva escapes into the water and casts about to find some neighboring aquatic fly-maggot, upon which it fastens itself and finally penetrates

the body by means of spines on its head. Here it lives as a boarder, inclosed in a tight sack until some hungry minnow passing by, gulps down the larva, young hair-worm and all. No sooner has the process of digestion set it free from its sack within the body of the maggot than it begins to make another bag for itself within the lining of the fish's intestines, where it lives five or six months. At the end of this period it is cast forth into its world of waters, remaining in a quiet condition until it has grown two inches or more in length, when it turns a rusty color and begins to move as we see it now.

Along the borders of the stream, amongst submerged grasses and half-decayed plants, we bring up the larvæ of that hawk of insects, the dragon-fly. It is no less ferocious in its mask than when shooting and zigzagging along over the surface of its former dwelling-place. If we wish to preserve our other specimens we must put it in solitary confinement. Notwithstanding its ugliness in appearance and action, it is very entertaining to examine with the glass.

As in the perfect dragon-fly this larva has large, bulging eyes necessary to seek its prey in the water. Seen from beneath, one would not suspect

that this slowly crawling creature could be so ferocious, for it seems not to have any arm by which to capture and seize insects and other water-loving animals that come in its way. But if some unwary creature happens within striking distance, how quickly the pupal dragon extends its long, sharp forceps, that had been carefully concealed behind a smooth mask, and, darting swiftly toward it, seizes and holds it with a firm grasp. This pincher is really the under lip of the young insect, lengthened and fitted to clutch its victim, but when not in use it is folded up and completely hidden from view.

I have seen it in a bottle with a mud-minnow twice its size. At first it moved very slowly and cautiously along on the bottom until it had come within the proper distance, when with a spring like a flash it pounced upon the unfortunate fish, seized it with its extended, nipper-like jaws, and shook it as a terrier shakes a rat. The struggle was of short duration. The minnow lay panting within the vise-like grip, while its life juices flowed into the insatiable maw of the dragon.

The manner in which it propels itself through the water is very curious. It actually breathes itself along! The process of respiration is carried on by trachea or pores situated in the tail, where

the water usually is taken in and expelled slowly, but when seeking its prey, forced out as by a squirt-gun, which carries the animal along with the swiftness of an arrow.

The beetles living in the water are really curious. It is interesting to watch their habits as they go paddling round in the glass tank, as busy as on the first day of their captivity; now swimming here and there as briskly as some of their land relatives run, now diving to the bottom to roll up portions of silt, or to rest on some accommodating snail, which is making its daily tour of inspection along the sides. The gentle vegetable-feeding carp or the smaller dace do not disturb their wanderings, but live with them as a happy family, apparently regarding them as the rightful occupant. How nicely has far-seeing Nature modified the different genera of *Coleoptera* she intended to be aquatic! One pair of legs are altered into oars, or covered with stiff hairs, by which they propel their boat-like bodies through the water, while the wing-covers, and the fine pubescence on the abdomen, and in some species on the thorax, are especially adapted to hold the film or bubble of air for respiration; thus enabling these creatures to remain a long time under water to obtain their food.

The representatives of two tribes of these aquatic beetles are now under our observation. Here is one rising to the surface with a bit of meat in its tarsi twice as large as itself. Its store of air is exhausted, and it must needs be replenished before it has completed its meal. How it ever manages to lift the hinder part of its body clear from the water is more than we can tell, but such is the fact. Then slightly raising its wing-covers it admits the air between them and the abdomen, tightly pressing the last segment against the elytron at the close of the operation, thus forming a perfect air-tight cavity, and confining the new supply to be breathed up through tubes situated along the sides of the body. Now it skurries away to the bottom to recommence its work as a scavenger, creeping into every nook and corner, peeping into the doorway of the caddis-worm's house, or lying in wait to pounce upon the mussel whenever it shows its dainty foot outside its shell. I have watched it thus for fifteen minutes before it again rose to the surface to lay in another light, but valuable cargo of air.

Another beetle in this tank, of the same family, but belonging to a different genus, is the *Gyrinus*, or whirligig, a surface-swimmer, never diving to

the bottom excepting when very much alarmed, and then quickly taking its bubble with it, it descends like a pebble thrown into the water by a sling, striking its chitinous shell against the glass with such force as to be distinctly heard. After awhile it clings to the spray of a submerged water-cress, remaining ten minutes in this position, and affording us an excellent opportunity of noting the difference of structure in the genera. Unlike the *Dyticus*, the first pair of legs are long, and the hinder pair are very short and changed into oars, and what is still more singular, it has four eyes, two above and two below, by which the insect can sight its prey or enemies in the air or water. Some flies are thrown in the tank. How it goes at them, tearing away the legs and wings with its sharp mandibles, and lapping in the life-giving juices — a prisoner's fare indeed.

A species of beetle, from the family *Hydrophilus*, which I suspect to be a vegetable feeder, and perhaps not more than half-aquatic, moves around awkwardly in the aquarium. It is able, however, to remain a long time under water, for its entire under part is covered with a thin bubble which looks as if a lining of quicksilver had been put there. The longer hind legs are not flattened into

blades, but are provided only with a few stiff hairs; consequently he is a bad oarsman, and when, made so light by the air surrounding it, it tries to reach the bottom it tumbles, and only three out of five strokes are successful. Upon removing one of these creatures from the tank and placing it back downward on my hand, the shining breastplate instantly disappears, and by the assistance of the lens I discover that the thorax and abdomen is clothed with exceeding fine hairs. Is it not these hairs that prevent the bubble from breaking while the beetle moves through the water? The poor insect struggles hard to regain its natural position. The legs are slender and weak, and can hardly bear its body. It crawls feebly along over my palm. No, it could never gain a living on the ground. It is only at home on submerged water plants, so let me replace it quickly, and observe its method of putting on again the corselet of steel. Land of wonders! It is done as if by magic. On the instant it strikes the surface the armor appears as before.

Now we will draw up slowly one that clings to this half-eaten stem, so that part only of the bug touches the water. The supply of air is taken in at the head, I am sure. By so working the club-

shaped antenna and legs, the bubble is formed and made to stick fast to fine hairs on the under surface, and then extended underneath the wing-covers. So completely is it surrounded with air that a white line, in contrast to the rich dark bronze, is seen filling up the space at the junction of head and body.

What elegant fish are the dace, dressed in light changeable silk! the belles of the apartment, and managing their trains with exquisite grace. Here are three species: the black-nosed, red fin and pond shiner, each making its own peculiar curve in the water.

The gold carp are the domestic bodies, notwithstanding their gaudy dress, and are always at home. It is said they first came from China—from some lake in the Celestial Kingdom—to a pond in New Hampshire! How many generations span it, and by what curious chain of circumstances did their progeny find this little sheet of water in the Granite State?

Although these particular specimens of which we speak were taken from the wild waters, the old instinct of contentment in captivity is still apparent. Their faces are not so solemn as those of the other inmates. They peer at you through the

glass sides, and then turn away with a wiggle of satisfied curiosity.

Do not fish sleep? Going to my tank at night I find them still, and near the bottom. Even the mites of mud minnows that are on the surface during the day sink down to rest their weary fins and tails.

A BUSY CITY AND THOROUGHFARE.

VII.

A BUSY CITY AND THOROUGHFARE.

BETWEEN a swampy woodland tract, and the higher pasture lands, a half-tumbled-down wall, with boards over the top nailed to the trunks of trees that happen to grow on the line, makes a convenient highway for a species of ants that have nested in an old wild-cherry stump that forms one of the posts. Hither I have come out this afternoon to watch the passers-by, to observe the manners and customs, the style of salutation on the road, and the occupation of this intelligent little colony.

About sixty feet from the settlement is a small water-beech tree that forms another post, and to this many are directing their footsteps, or from it returning to their domicile. There must be some attraction for them in this tree, so I have taken my stand in its shade to ascertain, if it is possible, what it is. On the trunk some are going up,

while others that seem to have obtained what they searched for, are coming down, and after getting on the straight road, without wandering or turning back, hurry as fast as their little legs can carry them, toward their cherrywood house. Incidentally I have reached up to gather a spray whereto is attached one of those peculiar nut-tassels, made conspicuous by the foliaceous bracts, and find it fairly alive with small green aphides or water-beech lice. On the under parts of the leaves around the twigs, in the cups surrounding the nutlets, are these parasites in myriads, drawing the life juices from them, which by some chemical process in their abdominal retorts is changed into a saccharine substance called honey-dew.

Ages since the ants, that are very fond of sweet things, discovered this fact, and handed it down from swarm to swarm, and so these sprightly fellows to-day are visiting their confectionary stores among the leaves. This species of aphides are green and wingless, having two tubes on the hind part of the body, from which exudes the sweet substance the ants are so fond of.

Here comes one down, its pouch distended with the extract of hornbeam. Let me time it and ascertain its pedestrian powers. Sixty feet of

boards, with breaks here and there, where it will have to travel out of its course, with a strong breeze blowing "dead ahead," and an occasional leaf brushing its pathway! Notwithstanding these obstacles it performs the journey in two minutes and a quarter. This is at the rate of twenty-one thousand six hundred feet per day! A person to accomplish such a distance, in proportion to the size, would travel faster than a railway train. Putting a drop of syrup midway between stations, the most of the little colonists passed on without noticing it. A few halted an instant, as if surprised to find this strange substance in their way, and then continued their journey to the land of more delectable sweets. Only one out of the many on the thoroughfare, stopped to drink. This one began immediately to lap it up with its maxillary and labial palpi, as a starved cat would milk, and did not leave the bountiful repast until its abdomen had become thoroughly stretched, when it turned back to the cherry-stump, having forgotten all about the objective hornbeam.

It was droll to see individuals, as they met on the road, salute each other with their antennæ. This interchanging of civilities appeared to occur only when they came upon each other in direct

line, when they would stand up almost erect, and crossing their feelers for a few seconds would seem to communicate. It would be interesting to know the nature of that brief conversation. The little pantomimists appeared to express affection for one another, and to signify that life and its prospects were bright. Beyond this my dull sense did not comprehend the subtle language, and I shall remain in ignorance whether a certain herd of aphides on the southern part of the tree yielded more food than those upon other branches, or what measures the workers had adopted at the last meeting. The purpose of plunder was strongly fixed within their little heads, and it was impossible to induce them to turn back, and go in the direction from whence they came, unless a helpless pupa was placed across their pathway, when they would appear astonished at finding prey so easily, and, eagerly seizing it with their sharp mandibles, hurry away to their home.

The sense of sight in ants, at least in this species, is deficient, I am convinced from the fact that they did not appear to be aware of the proximity of others until they happened to collide. Also at times, on another part of the road, when they chanced upon a dead branch or upon the twig that rested on the fence, they would wander up

and down its length apparently lost and bewildered. Their sense of touch, in consequence, is very acute, and it is evident that they feel their way more readily than they see it.

Here in the pasture a few yards from this noiseless but busy street, I have turned over a large stone that was deeply embedded in the soil. The event must have appeared to the bustling city beneath like a destroying cyclone or an earthquake. Squadrons and workers are hurrying in hot haste and confusion through roadways, under the arches, down the tunnels; never since they were a municipality has such a calamity visited them. Presently, however, as if by some controlling influence, order comes from this turmoil, and the hitherto panic-stricken inhabitants have suddenly bethought them of their helpless babes that are lying there in bunches exposed to the fierce rays of the sun. These must be removed to the galleries below, so all now have gone to work with a will, and the busy scene presented to view is one of marvelous interest. See this fellow tug at a sack which contains a pupa three times as large as himself! Now he holds it fast with his sharp mandibles, and staggers away with it over the uneven surface, as a small but sinewy porter would carry up-stairs a

large trunk or a bulky mattress. See him hold it up over his head, that it may not drag on the rough pieces of earth and thus injure the chrysalis! Now he falls down from a clump of pellets, but still clutches his precious burden, and hastens on to the mouth of the shaft, where he lays it down, "cuts" it round, adjusts it properly, and finally disappears with it down the covered way. Not one alone, but hundreds are working in this manner with all their might. Great interests are at stake; the emergency must be met or so many ants are lost to the world.

As one looks upon such a spectacle he is lost in admiration, and cannot believe that the little creatures are mere automatons, but that they are guided by an intelligence strangely akin to human reason. Indeed, was it not the wisest man who advised certain classes of his fellow-beings to study these insects and be wise?

It is curious to watch the busy, intelligent ways of these sand bees. Although they are not so social as the higher types of bees, yet they love to be neighborly, and so have established a flourishing little city of two or three hundred underground dwellings along the sides and at the foot of this hillock. Two or three individuals that have lately

concluded to settle here are actively engaged in digging out their tunnels, while the majority of the inhabitants are hard at work in gathering bee bread for their prospective families. Arrivals and departures are taking place almost every minute, and the scene presented is as orderly and business-like as any well-regulated and enterprising human community. It is interesting to observe how well each member knows its own home. Many of them fly directly to it, while a few, not so discriminating perhaps, appear to search for a long time, describing all sorts of curves and angles among the doorways, sometimes lighting and crawling in a neighbor's house, but immediately re-appearing. Here one coming from its hole stops at the mouth, and seems to take note of the surroundings, and then darts rapidly out of sight. Evidently she flew a long distance for a particular kind of pollen, for an hour passed before she returned.

It strikes one as intensely interesting that this tiny winged miner should have the memory of a special little tunnel in this sandy pasture, and that she should be guided to it with unerring certainty. What has guided her hither? Was it an instinctive sense of direction, or was she led here by

observing landmarks — the particular heights and shapes of certain young white birches that grow along the way by her habitation?

To answer these questions I have determined to try a few experiments. Capturing one in a wide-mouthed vial as she came from her home, I carried her carefully in a dark pocket, at the distance of three hundred yards and set her free. Although the prison door was turned away from her home, she did not attempt to fly farther off, but quickly ascended in an oblique direction and toward the place from which we had started and, of course, was instantly lost to sight. Immediately retracing my steps I was soon stationed at her doorway, which had been previously marked, awaiting her return. In twenty minutes she was back, humming on a high key, and after making a few wild flourishes around me, which plainly indicated a disturbed state of mind, she flew to her door with her baskets well filled with bread.

I then caught another that seemed to be unusually acute and sharp-sighted, and carried her off blindfolded a quarter of a mile. In just an hour she returned, not showing so much excitement, as if she had half-forgotten her adventure.

Thinking perhaps the path chosen was that

selected by the bees while bread-gathering, and wishing to be convinced whether or not they found their way by the general instinctive sense of locality, or had gradually learned certain routes, I kidnaped still another buzzer, and keeping her in the dark, excepting when it became necessary to give her air, walked leisurely to the hemlock woods a half-mile distant, and in an opposite direction from that taken in making the two previous experiments. Among the trees, after being imprisoned for an hour, I set her free with best wishes of a safe return. For three hours I watched her doorway. Some of the busybodies as they arrived circled near the opening, but did not go in. As the day was nearly done and my watching tedious, I abandoned the post, not without some compunctions, resolved to visit the burrow the next morning. It being pleasant, the bread-winners were improving each shining hour. The few slender pieces of grass spears that had been placed over the hole had been pushed aside, and soon my bee appeared as brisk and as nimble-winged as ever. Sure enough, under such adverse circumstances, she had found her way back, probably late in the afternoon.

Cases are on record of honey-bees wandering far

away and returning, but they do it with their own sweet wills, and have the use of their many eyes along the way; but here is an instance of an insect, lower in the scale, blindfolded and carried to a locality where, it is safe to say, she never visited before, returning safe and sound. It would have been interesting to have followed her through all her winding ways. Her long absence indicated sharp searching, and sharp searching means an active operation of mind.

This city with its busy hum is not without its robbers and murderers, in the form of the tiger beetles, that have come here to excavate their tunnels like their peaceable, enterprising neighbors. They are among the swiftest in the order *Coleoptera*, and veritable tigers in their predaceous habits. Their large eyes, sharp-toothed mandibles and long, slender legs, especially fit them for the trade of killing and making off with their plunder. Their larvæ, too — ugly-looking babies — as soon as they have attained a certain age crawl at the mouths of their burrows, where they lie in wait, ready to pounce on any unwary stroller that may come within their reach. These tiger beetles somewhat resemble that other family of runners (*Carabidæ*) so common under stones, where they hide in the

day-time but stalk abroad at night on their rapacious errands. Their wings, however, are imperfectly developed, some having merely pieces of weak, flimsy gauze folded under the wing covers, and never used. But the tigers are day highwaymen and very rapid in flight. While examining a specimen, I am struck with the ingenious mechanism of its wing. Beside the basal joint there is a hinge situated about midway on each side of the three outer veins, enabling the insect to fold it at will, and with the nicety and accuracy of a fan, beneath the bony covers, which protect the delicate gossamer structure while the beetle is digging in the ground.

A specimen imprisoned in a vial is observed with interest. Its color and markings harmonize well with that of the sand on which it runs. The manner in which it laps up the criminal's fare of bread and water is remarkable. How many implements it has about its mouth to prepare its food for swallowing; knives and forks, brushes, squeezers and hooks, all of which it uses continually. A fly is thrown in, when it instantly seizes it and begins the work of extracting the juices by the constant horizontal movement of its jaws, and the manipulation of its lip feelers. Its little

brush-like tongue is pushed into the softer parts of its victim, while now and then it presses the whole mass close in its mouth and appears to suck the viscera into its own. This operation lasts for five minutes, perhaps, when it suddenly disengages itself and nothing but the empty shell of the fly is left.

FIELD NOTES IN SEED TIME.

VIII.

FIELD NOTES IN SEED TIME.

THESE days of autumn when the earth is showing signs of drowsiness, and is turning her cheek farther and farther from the sun for a winter's nap, are as incomparable as those of June.

Now is the fruitage and fulfillment of what was promised months ago, and the leaves in their dying glory whisper to us their parting words as they fall, "We have lived only to make the seed, in which we shall breathe again."

As I walk across-lots I am struck with the various and ingenious methods the different plants have adopted to scatter their seeds. Here is an army of golden-rods and asters, milk-weeds and epilobiums, holding aloft on their wand-like stems millions of seeds, to which are attached balloons, parachutes and wings, that the wind at the proper time may carry them miles away. I wave one of these wands, when, as if by magic, hundreds of the

winged grains go sailing through the air like the flight of insects. Here, too, are hooks, barbs and prickles that cling to the dress of passers-by or to the hairs of cattle, and thus are carried away to be rubbed off and deposited in some other locality. Other seeds artfully hide themselves in luscious, brilliant wrappings that the birds may be attracted to them. Strawberries, raspberries, and the early drupes have scattered their seeds by this process; but the various cornels, honeysuckles, greenberries, rose and spice bushes, the bright red fruit-clusters of the winter-berry, the purple panicles of the prim, that feast the eyes of the autumn rambler, are still waiting patiently for the snows to put an embargo on other supplies near the ground.

The outcrop of conglomerate yonder is beautifully variegated with the different shades of moss and lichen green. From its base spring wreaths of fronds of the evergreen rock-fern. It is the only species hereabouts that does not fade with the year. How regularly the cinnamon-colored fruit-dots are disposed on the under surface of the pinnales, as if by artificial design! These are the only flowers such plants are capable of producing. The simple magnifier is not of sufficient power to disclose the wonderful structure of these minute

seed or spore cases, but look at them through the microscope, and you will look into a museum which shows the curious method that Nature has invented to sow broadcast these sporules, that appear like little puffs of fine dust as they fly from the ruptured sacks. What has torn open these cysts or pods? On the upper sides and half-way round them, grows a jointed, elastic filament, which, as it matures, is more and more inclined to become straight, till finally it suddenly springs upward, tearing transversely the membranaceous sack on the under side, and scattering the contents.

How often, at this season, in the woods, do we come upon that strange shrub, bearing its blossoms even while its leaves are falling, and the seeds, formed the previous year, are bursting from their pods! The blossoms of the witch-hazel is the rear guard of the army of the flowers. Oftentimes as late as the first half of the first winter month, when the frosts have rendered the sap dull and torpid, the inflorescence of this exceptional plant impresses the stroller as untimely and out of place. It has a medicinal, potent appearance. The long, crinkled, strap-shaped petals along the slender twigs suggest the intwisting serpents and wings of Mercury's wand. No wonder the sorcerer as-

cribed to it the power of communicating with hidden metals and waters underground.

Another example of seed wrapping, and one with which Nature has taken much pains, is the apple. A tree loaded with the shining, sun-painted fruit is a gorgeous spectacle in the autumn landscape. Often in our walks across wooded pasture lands we come upon what are called in New England Indian orchards. They perhaps grew from the seeds of an agreeable "chance acquaintance" that had touched the palates of the dusky hunters, who knew not the fact since discovered, that not more than one seed in ten thousand will produce a fruit so desirable, or like the original.

What tricks these apples of old orchards play on mankind! How fair this specimen that I hold in my hand, is to look upon! Its sides are beautifully polished, and its cheeks are ruddy with the vigor which its undomestic, savage life gives. No worm-holes mar its beauty. The coddling moths knew, if the stroller did not, that underneath the fair skin the heart was too harsh and ill-tempered to nourish her tender larva child, and so passed it by, and did not lay her eggs on the tempting calyx. On the ground are spread circles of white and red and yellow fruit. The crickets are epicureans and

eat sparingly at these tables. The cows wander by and pick a few; their eyes have not the half-shut, tranquil appearance seen when crushing a toothsome morsel, but are wide open and sparkle as the pome cracks under the pressure of their jaws, and the sour, acrid juice falls on the tongue. These creatures are now the real planters of apple-trees in out-of-the-way places, and some day by chance may drop a seed that shall take root and bear apples such as the world has never seen or tasted, and which the nursery men would go a long way to obtain.

The old, neglected orchards still found in almost every New England town, are interesting spots to visit at the harvest time. Much of the fruit is half-civilized, as it were, but the trees are honored with appropriate names. I recall such an orchard, where every tree in it was spoken of as kind of out-door members of the family, by the household, as the horse or dog might be.

The Boundmarks, as its name implies, stands close to the wall that divides the lots; a large, tall tree bearing diminutive but well-cooked pericarps, with green and maroon skins, and half-sweet and half-sour flesh.

The sour crabs is a smaller tree with large,

fair, symmetrical apples, but with a pulp that, if eaten, would prevent one from whistling for a week. They have about the stems a bluish cast, a kind of morose, acerb appearance, which at once warns you not to taste them. Then there is the mother's apple, that suggests a close relationship to the far-famed modern Porter; yellowish, egg-shaped, but with a deeper blush on the cheek, and a prominent ridge running lengthwise round the fruit, as if it hinted to the owner, "cut me in two here, and give half to your friend." The pomes named the oaks growing on another tree that stands near a sturdy acorn-bearer, might have honored some old Roman garden, they are so peculiarly rounded and tasteful. Their light green sides are broadly streaked with vermillion, and the cells within bursting and running over with spicy juice. Under the red wax is the banqueting place of the crickets and naked slugs. The rind has a greasy feel, and is of such a dark rich crimson that this coloring matter permeates the mealy, granulated tissue nearly to the core. The bitter sweets and the sugar sweets grow close together, but the chemists of the soil and air have poured from their secret reservoirs, into the woody tubes and fibers of each, a different kind of mixture, which makes the fruit

of one a bonbon, and of the other a pill of wormwood. The whites might well have been named the corpse apple, their cheeks are so pallid. All the sunshine of the Indian Summer has not the power to bring the glow of health on them. The meat has a sickish taste, too, producing a nausea if eaten too freely. But what a relish Nature has given to this water core; as if she had wrapped up a bit of iced sherbert close to the carpels! The tree that bears it stands by the roadside, and so enjoys a village reputation. The children fill their pockets with it, and those of larger growth stop their teams and alight to taste the fruit that is not forbidden them.

Thus throughout the orchard of more than a hundred trees, each one bears its own peculiar fruit; varieties so strongly marked, and presenting such distinct characteristics, as to lead one almost to the belief that they are incipient species of a large and extensive genus.

The fact that the wild apple presents so many individual differences, and that the seeds of each produce a new variety, is a curious and interesting one. No other fruit or berry in the family *Rosaceæ* has, I believe, such a natural tendency to vary. Nature has in this case given us an exhibition of

her originality, and fashioned and colored, spiced and seasoned to her heart's content.

Cut with your scalpel all the flesh of this pome from the core, so that the skeleton only remains, and admire the beautiful arrangement of the carpels! Each one of them is attached to strings that are tied together so regularly at the stem and calyx, as to form a five-rayed star. Notice the texture of the cell walls, as tough and transparent and impervious as mica scales. Nature must have a tender care of these germ leaves, so she has not only shut them up closely in cartilaginous boxes, but has packed them away in brown cases until such time as she can find a suitable spot for their vegetation. Take off the leathery wrappings, beginning at the smaller end, and you will see the rudimentary trunk already pushing out from the folds, as if impatient to know its fate.

Perchance this pure white starchy embryo, which I now hold up on a pin's point, under other circumstances would have grown to a stately tree, and borne fruit distinguished among all other kinds for its excellent flavor; and thus perhaps have I robbed the world of an apple whose palatable flesh and praises would have been on the tongues of millions. How readily the white lobes split into

halves which, if undisturbed, would have developed into green leaves. Have these germ leaves now in them the mysterious inherent properties to originate a variety unlike the parent tree, or would it have needed the many influences and effects during the growth to have produced a new form? It is a mystery that none can fathom. How richly seasoned are they with the essence of *Pyrus*, the oil of apple, and as tasteful as almond meat.

A. P. De Candolle, the Swiss botanist, says,— “The country in which the apple appears to be the most indigenous is the region lying between Trebizond and Ghilan”—provinces in Asiatic Turkey and Persia—“where small wild forests are still to be found.” By what chain of curious circumstances, both of natural and artificial sowing, did this fruit find its way northward through Europe, and finally across the waters of the Atlantic to the shores of the New World? The pastoral Aryans had perhaps cultivated it in the fertile valleys of Western Asia, and from there it may have been conveyed by the Romans into the Western Empire, of which France, Spain and England were a part. In later years, the early navigators of these countries must have brought the seeds across the ocean, as did the Puritans and non-conformists —

possibly from the garden of Woolsthorpe, where Newton was told about the laws of gravitation — planting them about their new homes. By its sterling qualities, man from the early ages has naturalized and domesticated this fruit, and its course with civilization has been westward, till it completed a circle round the globe.

It would be interesting to know how far back in the history of the world originated the game of "naming the seeds," or of throwing the apple-peeling over the right shoulder. Hundreds and thousands of years, I venture to say; before the modern "Huldies" and "Zekles" attended the apple bees; customs that perhaps prevailed in the kitchens of the Lake Dwellers and Aryans, and have been handed down from parent to child through many generations; changed to serve and harmonize with time and place until they have reached us, that are not yet entirely emancipated from the old credulities and superstitions.

The fields of maize, ripe and abounding with the rich, heavy fruitage, are beautiful pictures in the mellow autumn days to the poetical observer of Nature, and offer to the harvest-home, as well, a standard of value equal to that of gold. The long spikes bend over like horns of plenty, filled

to the brim with yellow nuggets ready to be poured into the bin. Indian corn is a paragon of beauty and excellence among the cereals, and a unique species in the family. Not a single spear of it has been found growing wild by our botanists, and it is safe to conclude that it would have long ago become extinct, had not some tribe of Indians, or perhaps more ancient people, knowing its nutritious qualities, saved it from annihilation by improvement and culture. Unlike oats, barley, wheat, rye, and many other species in this important grass family, it is unprovided with barbs, bracts, awns and other appendages by which their grains are dispersed. The kernels are firmly fixed on the cob, and when the ears fall to the ground, the germs of the large seeds only would be eaten by many animals, or if they were picked up by the birds, the process of digestion renders them unfit for germination. Under these conditions such a serviceable cereal was destined to be lost to the world. It is interesting to imagine what might have been the forms and types of other fruits and grains that were not fit to survive in their wild state, and long since fell out of the race, but which could have been saved from destruction, as was this maize of ours by cultivation. The Indian

corn was indigenous to the American continent, and the only species now in the genus *Zea*; no other grass is nearly like it. It stands apart, cast in a different mould, and a king among them all. The conditions of soil, climate and culture have, indeed, changed it into many varieties. In the stalk, ear and grain there is a wide difference between the stinted, red pop kind and the gigantic Kansas Dent; or a Brazilian specimen with ears no larger than a common little finger, and kernels the size of mustard seeds, besides a Peruvian variety with grains an inch in length. The cobs may be either long and tapering, or short and blunt, with kernels of various colors, sizes and shapes; soft, smooth or wrinkled, but all having that specific quality of *Mays*, which attracted many hundreds of years ago, the attention of some wise savage, to whom we should be grateful for preserving such valuable grain.

The names of several favorite varieties in different localities in New England are suggestive of their origin, and show how highly they were valued and cultivated, even by the half-civilized tribes of Indians. There is a golden Sioux or Northern Yellow Flint, obtained of the Sioux Indians of Canada. The ears are twelve-rowed,

with medium-sized grains and compactly set. The King Philip, or eight-rowed Yellow, with long slender cobs and large broad kernels, was raised by the Wampanoags long before the landing of the Pilgrims, and proved a greater benefit to mankind than their arrow-heads or tomahawks. The Rhode Island White Flint, which many of our Eastern farmers esteem, was probably a legacy of the Narragansetts. The kernels are broad, and the flour made from them is nearly as white as that of wheat. The Tuscarora corn is another white variety. Our familiar sugar succotash, or papoon corn, so delicious when boiled or roasted in its milk, was, no doubt, as its latter name would imply, the only confectionary eaten by the Indian babies. It is said to have been "cultivated by the Susquehannas, and was brought to Massachusetts in 1779, by Captain Richard Bagnal on his return from the expedition against the tribes of the Six Nations, under the command of General Sullivant." When ripe, the grains are thin and wrinkled, and contain a good supply of sugar and phosphate, but a small quantity of starch. From cultivation and hybridizing, have come two kinds of sweet corn; the white cob and the red cob. The cob of the latter variety, when stripped of its

kernels, looks as if it had been stained in poke-berry juice; the stalks and mid-ribs of the blades too are veneered with a beautiful polished, maroon-colored cuticle, and the sap is remarkable for its sweetness.

The brilliant hues of many varieties of corns are quite curious. How often Nature is inclined to paint them blue and purple, to streak them with yellow and red, or double dye them with that deep rich pigment that suggests a spike adorned with garnets or rubies. This glowing beauty, however, is accidental, and only skin deep, for if the hull is removed, the light or yellowish farinaceous substance is seen as in the common kinds that have transparent coverings.

The rice, or squirrel tooth, has perhaps a greater tendency to paint its kernels in lively colors than all other kinds. A heap of husked ears on the floor presents a striking and beautiful appearance. It contains, also, more oil than other kinds, and on this depends its famous popping qualities. Perhaps this variety comes nearer the wild type, and something like it may have been brought by the Indian savages of Peru to Manco Capac and his sister Mama Oello, the first of the Incas and the children of the sun, who taught them to cultivate

it and other plants, "and to live like rational men, and not like brutes."

Nature has her arithmetic as well, and whispers it to every stalk of maize. As if by the process of calculation the ranks of kernels are invariably arranged along the pithy receptacle in even numbers. Eight, ten, twelve, fourteen, eighteen, twenty, and so on—as many as forty rows in some varieties have been counted. Disrobe this long spike, carefully noting the manner in which the beautifully pink-tinted husks overlap each other, and the soft, silky texture of those growing next the corn. How accurately placed are the grains on the cob, each one almost as firmly set as a tooth in the gum. Their crowns are rounded and brightly polished, and their sides and edges regularly beveled to fit into their sockets. At the base of each kernel is a little cavity or pit in a radial line from the centre of the cob, and always on the side toward its tip, that contains the embryo plant. From these still adhere the long silken filaments that hang out from the point of the husks, now in a brownish tuft, but freshly green last summer, when on the tips of these delicate fibres dropped the pollen grains from the tassels above, and taking a kind of root or tube sank down,

down, into the loose tissue of the threads, as rootlets sink into the soft earth, until they reached the embryo sac. There a miracle was performed that changed the ovule into a kernel, exquisitely finished as we see it now.

The associations of husking festivals and apple bees are pleasantly related; voluntary, gratuitous aid is offered by neighbors, chiefly among the younger members, for the sake of fun, and to gratify the sociable nature. Yes, it is interesting to consider from what different sources have sprung the myths, customs and traditions in each of these gatherings. Ah, the old-time huskings! On the fork handle, suspended from the mow, is the lantern, shedding its light on the row of hard-handed and brown-faced beaux and maidens with lips and cheeks aglow, like the ears of ruby maize. Mid laughter, song, story and the rejoicing at the finding of a "red ear;" mid the rustling husks, cracking knobs, and the sound of that plenteous outpouring from the ashen cornucopia into the rack or on the drying floor, the large heap melts away like snow wreaths before the sun. Meanwhile the supper of corn-bread and beans is prepared, and thither the farmer leads his Arcadian retinue, who attack the good things with a cheer

corresponding to their eariler merriment and gayety. Then homeward in couples they go, singing under the bright harvest moon, in company with those pale little seranaders, the crickets, that pulsate and chirp, *Curate, curate, curate!* in perfect time, like a host of violinists under the direction of a mysterious and invisible leader. It is a monotonous and melancholy strain that fits itself to the fading year, yet soothing and restful withal, like a lullaby that sings the retiring world to sleep.

CROSS-CUT VIEWS OF WINTER.

IX.

CROSS-CUT VIEWS OF WINTER.

WINTER, although it offers shorter commons to the observing rambler than other seasons of the year, nevertheless invests the fields and woods with many peculiarly interesting phases of nature, which he can ill afford to lose sight of. In spring, summer or autumn, during his walks his imagination and memory are crowded with thousands of wonderful sights and events in plant and insect life; but now the page on which he was so engaged is nearly sealed by the snow and ice, and so he perforce must adjust a nicer pair of glasses, and look sharply about him, in order to gratify the desire to learn what this apparently blank white cover may have written upon it.

There are days when the earth is circumscribed with blue and silver. The azure vault without a cloud, and a wide stretch of pearly lustre below; a sprinkling comes before the cold, and with icy

polishers launders the immaculate drapery. With a glass, the sheen of the ice varnish on the hill-sides, ten miles away, is visible, and the spots among the evergreens glow like white flames. The yellowish reflections and the sharply outlined blue shadows of objects on the enameled landscape are at different angles, and present a striking appearance. The trees are made of glass, bedecked with gems that quickly change as if by magic, from amethysts to emeralds, sapphires to rubies, and again to opals and pearls.

A fairy land indeed. In the evenings the moon rises early and, like a genial warder, glides through the galleries and chambers, again polishing the floors and lighting up the tree chandeliers with millions of diamond jets. In the distance on the white fields and hills rests a dim light, as if in the full light of the sun they were viewed through a piece of delicately azure-tinted glass; the evergreens, in striking contrast, appear almost black with their distinct clear-cut shadows, while here and there, in relief, like crimson checks in alabaster, gleam the ruddy cheerful lights of evening lamps.

Truly, in winter, even, there is much to interest one who walks across lots. Pretty pictures, cun-

ning devices, and elegant views of architecture to those who have eyes to see them.

Look at this southern hillside, studded with slim, middle-aged hickories, maples and oaks, basking in the lustre of the winter's sunshine ! A declivity of purple spray above, rising up against the dark blue sky, while the whitened slope beneath is scrawled with the shadows of trunks and boughs. Stop for a moment in a sheltered place, where the light breeze has not disturbed the snow, to contemplate this low patch of straggling green-brier. Every thorn, tendril and stem has caught the flakes as they fell, until the tangled mass appears now like a huge piece of whitest coral. Here is a half-buried clump of sumacs, as if a herd of reindeer had shed their horns. Along the side of the hill by the edge of the woods, where there are various eddying winds, the snow-lines are crinkled in as many curious and fantastic shapes as there are freaks in the weather-vane.

The gently moving air stings quite keenly the ears and face as you walk against it. I have taken refuge for awhile on the leeward side of a huge boulder of conglomerate or pudding-stone, which at a distance, through the trees, resembles a large hay-stack, so regular is it in outline. What

an ancient landmark is here, and what a marvelous history is chiseled on its sides ; surpassing in antiquity the Egyptian hieroglyphic writings, and recording events that happened before man appeared on earth. What agency was at work in the long ages past, that brought this mass of rock and landed it here where the forest now stands ? From what place, and how far was it brought ? Its measurement in length and height is nearly twenty feet, and fifteen feet in breadth. Nine thousand cubic feet of solid rock carried along by a great glacier that evidently once pushed its long, icy tongue over the land, far southward, down to the sea.

This is not, however, an erratic block, as the geologists say, for beneath the soil everywhere in this section, and for many miles north and south from here, stretches a narrow belt of this same kind of conglomerate — compressed clays and sands into which pebbles have been incorporated, like raisins in a pudding. It may be presumed that this belt of pudding stone was once the bottom of a long river, or arm of the sea, and into this body of water, for ages, gravel and silt from the surrounding hills had flowed. At last, by some sudden or gradual upheaval, the land is raised, deep strata of mud mixed with shingle appear, showing how century

after century the squeezing and pressing agency has been going on, until the whole mass is again changed to a concrete ledge.

Although the inscriptions on this ancient monument have not been effaced, many of the characters are undecipherable, and the true history of it cannot be written. A large white-oak has grown so closely to one of its corners that the trunk has become distorted, and grates on the pebble-plums at every puff of the wind, as if the rock and the tree were telling each other secrets.

On the top of this monument the wind sifts a magnificent heap of gems, broken stars, needles, prisms, that must be melted down and return in vapor to the cabinet above before they can be formed into perfect shapes again.

In these cedars, the locks of woolly snow that have lodged in the thick leaves are blown off by little whirlwinds that now and then roll silently along, and scatter millions of powdery crystals through the air, looking like puffs of white smoke. How comfortable these evergreens appear in their well-woven garments of green! It is a relief to look on them, this cold white day, they give such a fresh, cheerful aspect to the winter's landscape. These spruces are the typical trees, high north-

ward and on the mountains, as though Nature had assigned to them the drudgery of enlivening the scenery in bleak and barren spots.

The brook below the hill that flows from a warm spring has a melodious gurgle; the ice casing here and there along its course, over and between the stones, is a kind of sounding-board that propagates the merriment, making it more musical than in summer. Pry off some of these ice casings with your cane and observe the different exquisite patterns of cut-glass dishes! Note also in places how the large drops or fragments of water have by chance become detached from the main body of the stream, and appear like inflated leeches, pushing out their heads and attenuating their bodies into filaments of quicksilver, as if feeling for the most convenient channel for escape. The rim of the warm spring above is ornamented with frost-work of curious and beautiful forms. What wonderful phenomena! Take up a tuft of grass whereon the crystals have accumulated, and in a sheltered place, directly "in the eye of the sun," see with your magnifier how the hexagons, stars and prisms with which the miniature but gorgeous spires of the ice palaces are made, gradually melt away. There totters a steeple. There a delicately

wrought pinnacle bends over, breaks off at the base and adheres to the grass blade. There a star flies away and vanishes in the air. Rhomboidal blocks are dislocated and tumble down, till nothing is left of the beautiful architecture but the tiny drops of water clinging to the stems.

The birds that brought this cousin to the olive, named the privet or prim, have not lived in vain, for its persistent panicles of shining black drupes supply food to many hungry stomachs and crops during the snow embargo. A partridge has been feeding on the berries, some of the pulps and skins have fallen from the bill on the snow, staining it with the rich purple oil. Some seed-eating finches have lightly printed the snow around a dry primrose stalk, and broken off the grain-bin covers for a meal.

Everywhere there are signs of a hard struggle for existence. Everything that projects above the snow is thoroughly inspected, that it may furnish some seed or grub to sustain life. It is the severe extremity to which these animals are put that develops the sharpest eyes and claws and the keenest senses to enable them to search for and find their food, and only the more vigorous survive. The owner of that melancholy scream, the

blue jay, is a hardy "winner in life's race," albeit he is complaining bitterly of his hard lot. The bright plumage and discontented voice brings a bit of spring into these winter solitudes.

In these cedars, where the robbers love to visit, are often seen large tussocks, formed by thickly growing twigs, where the dry, needle-like leaves have fallen off and lodged in their midst.

These tufts prove excellent caravansaries for the winter birds, for beside the shelter they give, they are generally quite well supplied with the larvæ of certain insects, and in many of them are found hoards of chestnuts and acorns, evidently stored there in the autumn by the jays and wood-peckers that have noted in their memoranda the locality of these granaries, and so visit them in the days of shorter commons. Sometimes a last year's nest will be packed full of edibles — cairns established by the provident birds or squirrels that know as well as the wisest weather prophet the coming of a snowy day.

Among the birds that visit the cedars at this season, none are more successful in bearing its severity than the singular wax-wings, or cedar birds. They come in squads of fifties or hundreds to settle in the spray and feed on the pungent,

aromatic drupes so bountifully spread out before them. How bright and smooth their plumage looks ! The broad black velvet eye-stripe and head-crests give them the appearance of being well-protected from the weather by fur caps and ear-muffs. Nature must have been in a freakish mood when she gave her attention to the dressing of these birds, for, beside the narrow, sharply-defined yellow band across the tail, the males have on each of the tips of the secondary wing quills a strange, horn-like appendage, that resembles bits of red sealing-wax, or crimson buttons on the backs of their chocolate-colored overcoats, as if they were marks of higher rank. At times they huddle together in the shaggy trees or roost in rows along the branches to warm their feet, wing-shoulder touching wing-shoulder, and utter faint notes of sympathy while combing with their beaks their plump shining breasts. They must keep their ovens well supplied with carbon, so whenever they think of the delicious "frozen thaws," one after another will fly out from the flock, stuff themselves, and then return to the wax-wing association, as if they knew that in union there was strength and mutual advantage during these winter days. They open their bills so wide that it seems as if their

heads were nearly split in two, and swallow the fruit with such a gustful relish that it creates in the looker-on an appetite for the same kind of dinner. At this season these birds are very erratic in their wanderings. One might visit the woods every day for a fortnight without seeing hide or feather of the Bohemians. Why they are placed by naturalists among the chatterers is not quite clear, for they are the most silent of birds; even when talking with each other, only the softest whisper is heard.

Perhaps their irregular and sudden appearance may be accounted for from the fact that they are only raiders, after all, from the great feathered army southward, and, in love of adventure, make occasional dashes into the enemy's country, like cavalry squads, to reconnoiter and note the prospects of a spring's campaign; or, perchance they are driven by the snow from the shores of Lake Winnipeg and Hudson's Bay; for even in those high latitudes, as far as the wooded country extends, they may be found.

The mention of the northern regions reminds me of those hardy little buntings or snow-flakes which inhabit the shores of the Polar Sea in the breeding season. When the streams and ponds

are sealed with ice, and the snow is too deep for them to obtain their food, that consists of seeds from aquatic and land plants, they wander southward, sometimes as far as the Middle States. It is usually during the first months of winter that they are seen in New England, skimming and whirling over the half-buried stubble like veritable snow-flakes driven about by the wind. They fly in compact flocks, and their dark streaked backs are quite conspicuous against the snow. Each company appears to be governed by a leader which evidently is a restless bird, for they never remain a long time in one locality. Now they settle down in a patch of weeds, and run along as swift as sandpipers on their black wire-like legs, and stretch their necks to peck at the seed pods ; then off they go with a whirr, as if they had found nothing, or feared that the oil in their wing joints would become chilled. It is interesting to watch them, they are so wild and free to roam over the snowy waste, picking up their dinners anywhere from the North Pole to the fortieth parallel.

Where are their bivouacs at night? In the thick, sheltering copses perhaps, or under the lee of some projecting bank, where, huddled together, they dream, perchance, of feeding on the shores of the

Northern seas. Would it not be an entrancing spectacle to witness such a cluster of animated snowballs?

There is another hardy little seed-eater which often stops with us all through the cold season, as well as in the summer-time. By the first of November the goldfinch has changed his bright lemon-colored suit for a brown and yellowish-green coat that he wears through the winter. Even his bill, that in the breeding season is buff-yellow, has been painted dark brown. He is wrapped up so differently, the color of his plumage appearing to have changed the contour of the body, and the condition of the season often putting him in such diverse situations, that it is at times quite difficult to make him out. He is found clinging to the slender spray of the birches and alders in all sorts of uncomfortable positions, apparently amusing himself by pecking at the last year's catkins, pulling off scale after scale, flirting them away with his bill, and turning his head to see them float off in the breeze and settle on the snow.

Sometimes the lesser red poll, another brave, weather-proof little visitant from the North, is found in his company, perhaps because he is a near relative. The shape of his tail, wings and bill are

much the same as those of the goldfinch, but a great deal of the plumage on the back and flanks appear as if scorched, and he wears a carmine closely-fitting scull-cap. They appear to be very happy together in these winter solitudes, and often go bounding through the air like so many egg-shells tossed along by high waves and heavy winds.

The trunk-climbers too, titmice, nut-hatches, woodpeckers and creepers, are successful. They have full swing of our Northern woods in winter, and have hastily colonized, for the purpose of social interests and pleasures. How curious it is that these birds, representing as many families, but with similar habits of feeding, never flocking with their own kind, should, as the cold weather approaches, at last be impelled by some new influence to seek the companionship of strangers, and feel the need of sympathy while struggling for a livelihood.

Ah! here is a small flock of chickadees (*Parus atricapillus*), that I have surprised climbing about on the trunk of this patriarchal willow. The black-capped titmouse is a real Mark Tapley among birds, and actually seems to be less joyous in the midst of summer sunshine and foliage than when the cold winds whirl the snows of winter before

his door. How wonderful it is that such a wee bit of a bird "should come out so strong under circumstances that would make many of the other birds miserable"! One would suppose a good cold breath from Jack Frost would whiff the life from them. It is true they are wrapped in the best kind of overcoats, with black caps drawn over their ears, and good chest-protectors. But what in the world of wonders saves those little wires of legs and claws? What fiery hearts they must have in their breasts to force the blood-corpuscles through the tendons in the coldest days! What pleasant, convivial, round-headed little fellows they are, calling to one another from their holes in the trees, living on the best of terms with their neighbors, and arranging picnic-parties with the downy woodpecker and other next-door friends. If the day is favorable the invitation is accepted. Hairy comes from his log cabin when the sun is high, for he is not an early riser at this season of the year.

The bright white spots of this woodpecker glisten as if the snow covered it, and had only been partly shaken off by the rapidly moving head and wings. At times it appears to be as restless as the wood warblers, flying hither and thither about the higher branches as though it were seek-

ing for winged insects. Sometimes it perches horizontally on a bough, but this evidently is not an easy position, for it quickly resumes the perpendicular, for which its organization is especially adapted. It hammers on a tree, at first striking a few rapid, steady blows; then raises its head higher or farther away from the trunk, to deal heavier strokes, as if impatient with the persistent bark.

The yellow hammer, from his four-story window, cries "*Peop!*" The flight seems not to have the free and easy lope of the summer time. The brown creepers are blowing their tiny trumpets.

What an odd bit of feathers is this little *Certhia familiaris* as he moves around the hickory trunk, as if climbing a spiral stairway. It is the only species in the genus that visits our New England woods. Although it has all the clinging and climbing facilities, sharp claws nearly as long as the toes, and rigid shafts for tail feathers, it never turns round or drops down on the trunk. The bill is long, slim, and decurved; not fitted to chisel the wood, but employing it rather as a pair of tweezers, to extract the grub or eggs hid down in the crevices and behind the loose patches of bark. It is difficult to keep track of him, he is such an agile

little climber, and so much the color of the tree. In certain favorable positions I see the gleam of his pure white breast — as though Nature thought it not worth her trouble to paint the underparts a protective hue, his legs are so short — and his body pressed closely to the bole. When he moves away, he flies directly to the foot of another tree, and begins his upward search.

The nut-hatches, with hoarse voices, are saying, “Humph! humph!” as if disgusted with the scanty fare these upright tables afford. Their scolding is in striking contrast to their sprightly, good-natured gymnastics as they move lightly here and there on the sides of the trunks, heads downwards and sideways, gleaning what the superficial creeper leaves behind. Into the fissures and crevices of the bark have crawled troops of ants that lay huddled together in their winter’s sleep. Thousands of fat grubs, plump sacks of spider’s eggs, numerous wood mites and aphides have been nicely stowed away in almost every cranny and crease, just for the purpose of feeding, it would seem, these hungry little feathered bark-searchers and meat-eaters.

It is a wonder that the store of parasites is not exhausted before the winter is ended, there are so

many keen eyes peering, and so many tools, made with such nicety, continually at work picking, prying, boring, chiseling and probing at these bark-covered warehouses

Thoreau says, "When you have weathered January, you get into the Gulf Stream of winter and nearer the shores of Spring." The old revolver hastens now to turn her cheek more directly toward the round winter fire, far off in the southern skies. It is on such days we contemplate it with awe and reverence, as did those worshipers in the olden time. Thou Sun, father of all that live, say we, that distributes to us the seasons, that supports and sustains us, and swings us around in space as with thy thumb and finger, do not sever the cord that binds us to thee, but in thine own good time send thy rays, in turn to shine directly on this zone, that it may again be clothed with a vesture of green, and yield us abundant harvests!

In Feburary many spring-like days are thrown down to us. The chains of stern King Frost are unbound, and the ice and snow transformed, run singing toward their home. The streams are like pennants of changeable silk, trembling with shining lustre. Looking along their length, from the sun, where the water runs over shallows, the dark

ripples are edged with bronze that curl and undulate like water snakes, while the little tufts of green grass, mingled with the blue, white and purple pebbles, their colors intensified by the running water, give the bed a brilliant, variegated appearance. Over the flowing water a few ephemeralids are sporting in the sun, so soon have they felt its influence. The species are quite small, and resemble gnats when flying. Their wings are grayish white, with numerous black veins, and their slender bodies have two appendages at the end. By this stream a musk-rat has been using his chisels in a fresh green willow branch lately blown down. The notches in it are clearly cut, showing marks like those made by a small, keen carpenter's gouge. Was he gnawing it for food, or cutting logs for his lodgings, like the beaver? The bark is nibbled only where the deep cuttings were made. One twig a half-inch in diameter has been gnawed in two. Here where the pussy willows grow I notice many of the terminal buds have grown to an unnatural size, and resemble small pine cones with the scales closed. This is the work of that little female gall-fly (*Cecidomyia rigidæ*). Curiously enough, she invariably chooses the topmost bud on which to lay her eggs. When the bud was

growing last spring, she flew to it, and with her ovipositor poisoned the living tissues, and, in some mysterious way, caused this strange deformation that is now the home of the larva or maggot. What a snug little cock-loft of a bedroom it is! The roof and sides are made impervious to the wet and cold by the imbricated, varnished and woolly scales. Here the sleeping grub on its mast-head outrides a hundred winter storms, and waits for the April sun to wake it up and give it wings, that it may fly away to perform miracles like its ancestry. By tearing off carefully course after course of the concave shingles one may bring to light a little salmon-colored worm lodged within the four narrower scales in the centre of the bud. Here it is wrapped up in a thin, transparent coverlet, the head toward the base of the bud, and so deeply buried in the woody end that it is difficult to detach it without rupturing the body. The position in which it is placed would lead one to believe that it may, at certain stages of its growth, draw what little moisture and food it needs from the twig.

There is a woody flavor in the air that was not perceived a few days ago. The little brownish-yellow cones on the twigs of the white cedars (*Cupressus thyoides*) are already quite conspicuous.

The scales of the catkins as yet are firmly closed, and must have been formed last summer, as were those on the common alder and birch. What has prevented them from freezing? How curious it is that Nature, although apparently she has taken no pains to protect these naked buds, should be so particular in other flower germs like those of the willow and hickory, to wrap them up in warm furry blankets! The flower scales of these hardy aments are closely crowded together and seem not to want any extra clothing. They even grow slowly on these sunny winter days, so eager are they to be on time in the early spring.

How readily the last year's birds' nests are found now in situations least expected or foreseen in the summer! They have a neglected and weather-stained appearance like abandoned human dwellings with no cheer or system about the door. Here is a wood-thrush's home, that the couple were so anxious about in June. In this leafless shrub a warbler's nest half-torn away, and filled with a sodden mass of dead sticks, leaves and roseberry skins, has truly a pathetic aspect, when one reflects on the associations connected with it last season. Where are now the birds that were born in this little cavity? Will they return to this

wood another year? What persons in the South have heard or seen them? As you look into these deserted homes you have a curious longing to know the complete history of the little feathered lives.

In these days the owls, perhaps, fly a little farther north. One that has been wounded and left to its fate by some rambling huntsman, I find to be the short-eared species, a kind partly migratory and less common in New England than many others.

How queer is this family of birds with faces, and oftentimes with ear-tufts, like many of the mammals! The colors of fulvous and brown harmonize well with the hue of dead leaves and dark brown branches among which they sit motionless during the winter days, dreaming of midnight suppers.

It is interesting to note the soft, lax plumage which Nature has given this specimen, that it might glide silently through the air, and stealthily approach the unwary night-prowling mice which probably have been its only prey during the season. These, evidently, it has not found in abundance, for its body is almost as light as the feathers that cover it. It is also curious to compare the wings

of this noiseless flier with that of the grouse, which perhaps is the loudest of all the birds in flight. Nature has performed a better and more finished piece of work for the owl. One is a short, clumsy cutlass, beside the long keen pliant rapier. How carefully she has lapped the broad primary quills over each other, "so that no accident or pressure of wind may leave a gap anywhere," while those of the grouse are so loosely overlaid that one viewing the wing edgewise can see between each feather. The shafts in the raptor are more flexible, and the lateral filaments or *laminæ* are softer than those of the scratcher. The rounded downy tips of the first wing-quills are particularly noticeable. Even the narrow sides of the first two primaries are emarginate or edged with short segments, like the teeth of a comb, so precise has the old Dame been in making this wing suitable to perform the duty for which it was intended.

But the February heavens are not niggardly of their snows, and usually before they pass away, a good full share is sifted down to us. Sometimes the meshes of the sieve are small, and the bountiful supply of crystal grains are as fine as sand. Sometimes the air-fairies belabor the earth with little woolly pellets, or shoot from their tiny bows

a flight of needle crystals, or fling down a shower of stars or feathers. The month has many types of snow-storms, but the most beautiful of all is the kind that is seen now. "It has no fight in it," as Lowell says. As soft as whispers the light flakes are shaken down through the still air, each one falling in its appointed place over the wide stretch of fields and woods—a real shower of stars. I view them with the magnifier as they lightly fall on my sleeve; always six-rayed, but variously ornamented with the most exquisite filigree.

How busy have the fairies been on this day in arranging the molecules of water in so many indescribable forms of beauty! What infinite designing is shown by the great Architect in shaping such an endless diversity of stellar patterns, so regularly fashioned that it seems erroneous to say that the work is performed by the blind forces of Nature. Here an elegantly-wrought design has just been handed down by an unseen emissary of the sky. It must not be breathed upon, lest the minute particles, so systematically placed, be dissolved into a round drop of water. At regular angles the six-needle crystals cross each other for the framework on which are attached laterally other rays of definite lengths, so nicely graduated

and at such regular intervals as to appear like the skeleton of a pinnately-veined leaf. In the centre is a small star of embossed silver, placed over the point where the converging needles meet; its shorter rays alternate with those of the principal structure. This choice setting appears whiter than the other parts and scatters the light from its many glittering facets. Here is a wheel of six plain, fragile spokes that has fallen from the lapidary so far above, yet none of its parts are broken. Here is a spangle of club-shaped rays with a hexagon scale in the centre, and here a bunch of frosted moss-fern leaves. Are the airy fays so pleased with my attention to their handiwork that, eager to furnish new designs, they fling them down so fast that the delicate crystals strike against each other and become distorted and irregular masses of snow?

How evenly they are placed over the land; as mosses grow on the damp, shady forest's floor! Not a spear or twig that is without its coverlet of wool. Does the squirrel hear the tufts of down as they tick, tick, on his leafy roof high up in the walnut-tree; or the wood-mouse think of the path he perforce must shovel before his door?

All day long, and perhaps half the night, their soft white feathers have continued to fall, when

suddenly the wind from another quarter draws aside the dark curtains overhead, unveils the stars, and the morning sun shines again on the fair white landscape. There is a calm, peaceful rest pervading the face of Nature. A wide stretch of immaculate splendor. Every line and angle covered with white robes, arranged in the most graceful curves and folds, beset with glittering spangles and ornamented with embroidery of evergreens and the various figures of the hard wood spray. Stories as entertaining as the Arabian Nights or Gulliver's Travels are printed on the white plastic page after the storm, if the stroller will read the mystic letters.

I note the tracks of various prowlers in the woods. A rabbit has lately passed along, making indentations in the snow at regular intervals, as if he had been surveying or pacing off a certain portion of this lot for himself. Further on the lines appear more numerous; cross and re-cross each other, and are tangled in such a knot that it would be a hopeless task to find the creatures' homes. They seem to have gone everywhere, and arrived at no particular place.

Here a mouse has crocheted its way to a half-buried branch, dug several feet under the snow, and come out again to continue its meshing across

the path to the stone wall, where it has rooted for worms and seeds, leaving marks like the trail of a small snake. A troop of gray squirrels have been scuffling under a walnut-tree, like young human nutting-parties, for the largest and soundest fruit. They are the only rodents hereabouts that keep good hours. As soon as it is dark under the trees they all are carefully tucked up in their warm nests, while the rabbits and mice have just begun their travels. One of these branch vaulters appeared comical enough as it sat in the open window in the third story of its shag-bark house. Its nose and forepaws were resting on the sill, and its round eyes were like jet-black buttons set in the midst of fur. A male, perchance, that believed might was right, and thought this tree good winter quarters for a bachelor, had picked a quarrel with the original owner, the High-hole, and the tooth conquered the bill.

What is the purpose of the long, bushy tails of squirrels, if it is not that of steering themselves while vaulting among the branches, or using them as kinds of parachutes to prevent the rapidity of descent when they chance to miss their hold and fall to the ground, thus imitating as well as they can their relatives, the flying species? One, as it

scampers over the snow, holds its tail erect, and slightly curled at the tip, quite different from the position in which it is held while streaming along its arboreal highway, or while leisurely nosing under the trees for mast. No other rodent has such a brushlike appendage. In these woods there is a most severe competition between the red and gray squirrels, in which the latter seems to be gaining the victory. Not a specimen of the red kind appears even in the mildest days. He loves to eat his corn and crack his nuts at home in the winter, and so I believe lays up a larger store than his hardy gray cousin.

The frosting of the huge brown loaf is waxy, adhesive and in suitable condition for balls and statuary for the boys. A lump of it rolled along, hungrily laps up small sticks and leaves, and makes a clean brown path behind. How quickly a crumb accumulates into a mass of four or five hundred pounds, showing the immense weight that has been laid over the area of New England in so short a time. Millions of tons! If it had fallen suddenly, in one enormous ball, would not the earth have trembled, and been drawn in a marked degree from its orbit?

